Indian Year-Book
of
Ophthalmology

Third Year 1956

டாக்டர். ரஹ்மான், எம். பி. பி. எஸ்., டி. எல். ஓ.
கண், காது, மூக்கு, தொண்டை ஸ்பெஷலிஸ்ட்,
காரைக்குடி.

ROJA MUTHIAH
47, HOSPITAL STREET
KOTTAIYUR-623 106
P. M. DIST - TAMIL NADU
INDIA

Indian Year-Book
of
Ophthalmology

An Indexed Annual Review of the Progress of Ophthalmology

Edited by : **VAMAN D. SATHAYE**
B. Sc., L. C. P. S. (Bom.) ; M. L. C.
Member
Poona University Court;
Bombay Nursing Council;
Employees' State Insurance Corporation
&c.

ROJA MUTHIAH
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PUBLISHING HOUSE :
502 Narayan Peth, Poona 2 :
(India.)

LIST OF ABBREVIATIONS

A.I.O.S. : All India Ophthalmological Society.
A.J.O. : American Journal of Ophthalmology.
Arch. Ophth. : Archives of Ophthalmology.
B.J.O : British Journal of Ophthalmology.
B.M.J. : British Medical Journal.
Dan. Med. Bull. : Danish Medical Bulletin
M.J.O.S. : Medical Journal of Okasa University.

"Sufficient care has been taken to see that the information, statistics, etc., given in the Year-Book are as correct as possible. But we are not responsible for any inaccuracies or incorrect statements that may have inadvertently crept into the Year-Book.

Printed by : M. H. Patwardhan, Sangam Press (Private) Ltd. 383, Narayan Peth, Poona 2. *Published by* : V. D. Sathaye, 502, Narayan Peth, Poona 2.

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Abstract Review of Ophthalmic Literature

ALLERGY

1. Bacterial Allergy in the Eye.

1. Recent developments in the field of allergy are reviewed with reference to their role in the development of various inflammatory forms of eye disease. Particular attention is devoted to bacterial allergy.

2. A medical evaluation of 36 patients with various forms of eye disease referred to the internist for a search for foci of infection is presented.

3. One fifth of these persons, or the expected incidence in an unselected population, gave a past history of allergy. One third gave a past history of transient arthritis. Two patients had frank rheumatoid arthritis of mild degree. No patient had a past history of tuberculosis. Two patients only gave a history of tuberculosis contact.

4. Specific infections were related to one or more attacks of inflammatory eye disease in 16 patients as follows : Teeth, eight; pharynx, three; prostate, two; bowel, two; chronic empyema, one. Ten patients gave no epidermologic clues as to the cause of their eye trouble. The other 10 patients had various evidences of low-grade infections which were difficult to evaluate.

5. Skin tests done with a variety of antigens prepared from common bacteria, as well as with commercial preparations of tuberculin and brucellergin, were found to be useful.

6. The principles of medical management of these disorders is discussed.

ANATOMY & PHYSIOLOGY

2. Acetazoleamide on Aqueous Flow.

1. Repeated tonographic tracings on 50 rabbit eyes indicate that systemic carbonic anhydrase inhibition results in an average

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[1] Favour C. B. : A. J. O. : Nov. 1955 : 40-5(1) : 705-23.

[2] Becker B., and Constant M. A.; Arch. Ophth. : Sept. 1955: 54-3: 321-29.

of 63% (±8%) suppression of aqueous secretion. This estimate of suppression of aqueous flow induced by acetazoleamide is in good agreement with measured alterations in steaedy-state chemistry, turnover of test substances, and fluorescein-appearance time.

2. The remaining 35%--40% of the normal aqueous flow cannot be inhibited even by massive doses of acetazoleamide. Some eyes which exhibit only this reduced rate of flow appear to be refractory to carbonic anhydrase inhibitors, as to their effects both on intraocular pressure and on aqueous flow.

3. In some rabbit eyes the decreased inflow of aqueous humor following acetazoleamide is associated with a compensatory decreased facility of outflow, resulting in little fall in intraocular pressure ("pseudoresistance"). Such rabbits are "nonresponsive" to acetazoleamide only in terms of fall of intraocular pressure, for they do exhibit similar pharmacologic suppresion of aqueous humor formation to that found in "responsive" rabbits The administration of adrenal-steroids, such as fludrocortisone, can prevent the compensatory decrease in facility of outflow in these eyes, thus permitting a fall in intraocular pressure following acetazoleamide administration.

3. Clinical Examination of Corneal sensitivity.

The present clinical method of examining the corneal sensitivity by using a wisp of cotton is inexact and should be replaced by the von Frey method modified by the use of an adujstable nylon thread in a special holder. Normal sensitivity measured in this way is 15 - 20 mg.

When various pathological conditions causing decreased sensitivity are surveyed the following are the results: In glaucoma the sensitivity varies with the intraocular pressure. Corneal sensitivity may also be of interest in patients wearing contact lenses. The value of the exact determination of corneal sensitivity in neurological cases is discussed.

It may be of interest in otological cases with paralysis of the facial nerve to examine the corneal sensitivity and the nasolacrimal reflex. Similar methods are used to evaluate the effect of retrobulbar anesthesia and the advantage of adding hyaluronidase to the anaesthetic solution is proved.

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[3]. Boberg-Ans. J; B. J. O. : Dec. 1955 : 39-12 : 705-26.

4. Corneal Permeability.

(1) The permeability of the limiting cellular layers of the rabbit cornea to Na has been investigated by bringing a solution of it in contact with the eye for 10 min., and analysing the amount that penetrates into the cornea and aqueous humour. Test solutions of NaCl concentrations from 0·18 to 10% and *p*H from 2 to 11 were used.

(2) Solutions hypotonic to 0·9 per cent NaCl cause a rise in epithelial permeability which reaches a maximum of about ten times normal at about 0·4 perccent NaCl. Hypertonic solutions do not alter, or tend to decrease, the epithelial permeability.

(3) Increasing the tonicity of the solution bathing the cornea in the neighbourhood of 0·9 per cent NaCl causes a rise in the permeability of the endothelium .

(4) The permeability of the epithelium to Na is the same with a 0.9 per cent NaCl solution as with an isotonic glucose solution.

(5) Solutions buffered from *p*H 4-10 do not affect the epithelium but outside this range increase its permeability.

(6) The bearing of these results on the nature of the cellular layers, and their application to the preparation of drugs for instillation in the eye is important.

5. Resistance to outflow of Aqueous Humour.

(a) The resistance to the outflow of the aqueous humour increases with age, apart from any demonstrable pathological changes.

(*b*) Contraction of the ciliary muscle provoked by eserine lowers the resistance to the outflow of the aqueous humour.

(*c*) The resistance to the outflow increases or seems to increase as a function of the tonometric pressure exerted during tonography.

(*d*) The authors confirmed the observations of Barany regarding the diminution of the resistance to the outflow resulting from the administration of hyaluronidase.

6. Sodium and Chloride of Aqueous in Scurvy.

(1) The steady-state ratio of the concentration of sodium and of chloride in the aqueous humour to that in the plasma have been

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[4]. Maurice, D. M., : B. J. O. : Aug. 1955 : 39-8 : 463-73.

[5]. Weekers, R. et al. : B. J. O. : April 1956, 40-4 : 225-33.

[6]. Ridge J. W., : B. J. O. : Sept. 1955 : 39-9 : 534-39.

investigated in normal, scorbutic, and ascorbic acid saturated guinea-pigs.

(2) The sodium ratio (aqueous to plasma), confirming earlier work, has been shown to be 1·04, a value considerably in excess of that for several other animal species. The value is unaffected by ascorbic acid depletion or saturation.

(3) The chloride ratio (aqueous to plasma) has been shown to be about 0·90, and also unaffected by scurvy or saturation with ascorbic acid. This result is in harmony with the sodium findings.

7. Viability of Cornea.

1. With tissue culture as a test of viability of both fresh and preserved corneas, the results of 208 cultures of rabbit corneas are described.
2. Cultures were grown in Carrel D, 3·5 flasks with a half cornea planted in each flask in a thin plasma clot under perforated cellophane covered by a nutrient fluid medium of horse serum and chick embryo extract in Earle's saline.
3. Fresh corneas showed excellent migration of epithelial and fibroblastic cells in all instances within 48 hours.
4. Corneas which were soaked in dilute glycerol or soaked and then frozen showed a slight lag in migration but were soon indistinguishable in migration and cell appearance from fresh corneas.
5. Corneas frozen without glycerol protection showed no migration in 28 per cent of the cultures; the remainder showed retarded migration and severe cell injury.
6. The mechanism of glycerol protection from the harmful effects of freezing is discussed.

CONJUNCTIVA

8. Lymphosarcoma of Bulbar Conjunctiva.

What is the present concept of lymphosarcoma?

Most workers in the problem feel that the disease is one of multiple origins. These may be extranodal or intranodal. A focus which is accessible to discovery may be considered primary and monocentric if no other foci are found, but actually this is a presumption, since it is never possible to exclude a lesion which might

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[7]. McPherson, S. D., et al. : A. J. O. : March 1956 : 41-3 : 513-19.

[8]. Friedman, B. et al. : Arch. of Ophth. : Sept. 1955 : 54-3 : 381-85.

exist in a hidden locus. A so-called primary focus may be eradicated, but the disease almost invariably crops up 5, 10, or even 15 years later in another spot. When the sarcomatous involvement becomes sufficiently extensive, the tumor cells enter the blood stream in large numbers and the picture of leukemia supervenes.

Does the neoplasm metastasize?

Probably not. If cells do enter the blood stream or the lymphatic channels from the tumor, as they may during a biopsy, they are killed off by the phagocytes, which originate in the reticuloendothelial system. There is continuous vigilance on the part of the protective mechanisms of the body against invading tissue cells, and the maintenance of good health is possible when the virulence and the numbers of the invaders cannot tip the scales against the defensive capacities of the host. There is no definitive evidence, that the tumor extends by way of the lymphatics or blood stream. Even locally, lymphosarcoma is not severely invasive but, rather causes symptoms by pressure against neighbouring structures through tumor enlargement. Only in the leukemias is the blood stream considered to have been invaded.

Should systemic therapy have been employed in this case to ward off systemic involvement?

No. The visible lesion was readily eradicated by simple and safe means. Nitrogen mustard, radioactive phosphorus, and X-rays applied systemically should not be used as prophylactic measures. In this particular case the life expectancy of the patient is shorter than the time of probable appearance of systemic lesion.

Can a favourable prognosis as to future involvement be made because we have completely eradicated a primary focus?

No. Since the disease is one of multiple foci of origin, one must be reconciled to the expectation of future trouble in spite of having completely eradicated a primary focus. It may be that the primary involvement of some specific organs predisposes to a longer latent period before involvement elsewhere, but actually we do not have enough cases on record to predict the outcome on the basis of organ origin. Some of the cases of innocent lymphomata which we occasionally see, usually in the lower conjunctival fornices, may years later prove to have been the unsuspected indicators of a sarcomatous disposition. Early, it is impossible to differentiate microscopically between the innocuous variety and the potentially malignant form. More complete and closer follow-up histories are essential.

9. Inclusion Bodies in Trachoma.

(1) Observations on the morphology of the Halberstaedter-Prowazek inclusion bodies in trachoma are described.

(2) Using histochemical methods in sequence, it is shown that both initial and elementary bodies contain desoxyribose nucleic acid while the "Plastin" substance of Prowazek is identified as ribose nucleic acid; glycogen is intimately associated with the elementary bodies and may also be associated with initial bodies.

(3) Poleff's method is evaluated in terms of morphological, tinctorial, and histochemical criteria which are established for the true inclusion bodies; on this basis it is found to be quite unsuitable for indentifying the Halberstaedter-Prowazek inclusion body.

(4) The need for care in identification of the characteristic inclusion bodies in trachoma is again emphasized; a mixture of chemical and tinctorial method is profitably used to identify the inclusions, but this is still a somewhat tedious precedure.

10. Toxic Conjunctivitis.

The diagnosis of toxic conjunctivitis due to antibiotics was made in the authors' cases only after a careful history, clinical examination, and laboratory study . All had the typical syndrome, usually with an abrupt onset at varying intervals after receiving the medication. Some were only diagnosed after a remission on interruption of the antibiotic therapy. All had negative cultures or showed only saprophytic bacteria. All showed significant cytologic findings.

There was a tendency to a seasonal variation in these cases, those occurring in older patients being more common in the winter while those in the young were more common in the spring and summer.

Elderly patients having a marked skin telangiectasia of the face and lids were noted to be especially sensititive to the cold, and usually had a more violent type of toxic reaction when it occurred. The theory that sensitivity reaction is primarily a neurovascular phenomenon is bolstered by this clinical finding.

The onset of the toxic reaction after use of the antibiotic varied from one to two hours to one to two days if direct in mechanism.

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[9]. Dark, A. J., : B. J. O. : Dec. 1955 : 39-12 : 751-58.

[10]. Fedukowicz, H. et. al. : A. J. O. : Dec. 1955 : 40-6 ::849-856.

This suggested previous sensitization. Those cases developing after a latent period of six to seven days suggested the development of tissue sensitization coincident with the treatment of the present illness. It is well known that the conjunctiva takes part in the general sensitization in the body and that sensitizing the tissues of one eye may lead to sensitization of the other or indeed of the entire organism. In a sensitive organism a small amount of antibiotic may produce a violent allergic reaction.

Basophilic granules appeared in every case of toxic conjunctivitis so constantly that they have acquired the name of "toxic granules." The quantity of them was directly proportional to the severity of the process. While they are not specific and may be seen in other conditions, they are not seen to this degree in any but cases of toxic conjunctivitis.

The exact nature of these granules is unknown. They are presumably not solely a product of accelerated cell maturation because they can be demonstrated in mature cells of any type including fully differentiated epithelial cells. Possibly they may represent the same substance observed in other tissue cells in cases of general pathologic toxemias, or, as previously stated, thay may represent protein precipitation or agglutination resulting from the intracellular antibody-antigen union.

It is well to note the considerable similarity of not only the clinical findings, but also the cytologic picture of toxic conjunctivitis and certain viral conjunctivitides. The changes in the cell nucleus in periods of extreme activity or degeneration require further study. It seems possible to assume that antibiotics activate and mutate nuclear substances as well as certain bacteria under favourable circumstances. The possible connection between the mutation of cell nuclei and the origin of the xerosis bacillus is under investigation.

Finally, it cannot be stressed too strongly that the routine use of antibiotics for all types of conjunctivitis should be avoided. The sulfa derivatives and other agents are often equally effective clinically and much less prone to cause toxic reaction. It is a serious error to sensitize unnecessarily an individual to antibiotics in the treatment of some benign catarrhal, allergic, or non-infectious conjunctivitis and thus deny him its life saving effect in a later more serious general illness.

11. Vernal Conjunctivitis.

A change from a hot to cold climate was found to be by far the best palliative. Heat and dusty, dry atmosphere aggravate the condition, which is not as common in the humid climate of East Pakistan as in the dry, hot climate of West Pakistan.

Much has been written about pollens, animal inhalants, asthma, hay-fever, and vaso-motor rhinitis , but diet has so far received little attention.

Diet was claimed by the patients to be a factor in the recrudescence of symptoms in 14 per cent of cases. How this is brought about--whether by exogenous or endogenous sensitization, or by a mere reflex action--is not known. Onion may be taken to irritate the eyes by its volatile vapours, and spices and foods by reflex action.

The association of vernal conjunctivitis with intestinal parasites and skin and E.N.T. allergy is well known. The effect on vernal conjuctivitis of treating these associated conditions was remarkable, the degree of relief and control of the relapse rate being approximately equal to that achieved by cortisone therapy. It is therefore worth searching for and treating these associated allergies.

The irritative type of conjuctivitis is readily amenable to treatment, while the palpebral type is the most recalcitrant. In an early case most drugs (adrenaline, ephedrine, Privine, Phenergan, Antistin etc.) produce good results, but soon the conjunctiva becomes insensitive and they fail to excite a good response. Cortisone is the drug of choice, in this respect both as palliative and as curative, but it has to be used for the whole season from March to September to be of real value, and no good is done by using it haphazardly. Cortisone is the only drug which was found to be of value in the palpebral type; it gave 40 per cent relief and 25per cent cure where other drugs had totally failed.

In the few cases studied, the results of X-radiation were not at all encouraging, but this may be tried as a last resort when other forms of therapy have failed.

The treatment of 1,050 cases of vern al conjunctivitis is analysed. Certain articles of diet (onion, spices, beef, eggs, tamarinds, citrus, beverages, and brinjal) were reported by the patients to aggravate their symptoms. The treatment of associated intestinal worms, and

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[11]. Alimuddin M., : B. J. O. : Sept. 1955 : 39-9 : 540-44.

skin, and E.N.T. allergies, and the topical use of cortisone gave them best palliative and curative results.

CORNEA

12. Bowen's Disease (Intraepithelial epithelioma) of the cornea and conjunctiva.

1. Eighteen cases of Bowen's disease of the cornea and conjunctiva have been discussed, six of which represent follow up studies of previously reported cases.

2. The average age was 62 years, the mean age was 63 years, and the youngest patient was 40 year. The cases were evenly divided between male and females.

3. In six of the cases, the lesions had their origin in the cornea at the site of pre-existing disease. The remainder originated in previously healthy tissue : ten from the limbus and two from the bulbar conjunctiva.

4. Two of the patients had psoriasis for which they had received treatment with arsenic .

5. Five of the 18 cases had other precancerous lesions of the skin and mucous membrances, and four of these five patients had another associated primary malignancy.

6. Malignant change took place in three of the 18 cases: (a) A transition to squamous-cell carcinoma observed in a portion of the ocular lesion itself; (b) associated with direct spread to the nasolacrimal sac; and (c) metastasis to the parotid gland of the same side.

7. Simple excision was found to be a satisfactory method of treatment except where extensive involvement made enucleation necessary.

13. Corneal Lesions After Topical Anaesthesia.

Although the quantitative results varied considerably with the different anesthetic solutions and the different rabbits of each series, the qualitative results followed the same pattern.

Further instillations of the anesthetic agent after anesthesia eased showed progressive diminishing of the anesthetic effect until finally the effect was completely lost. This would seem to explain why, when anesthetic drops are prescribed for home use at one hour

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[12]. Locke, J. C. : A. J. O. : May 1956 : 41-5 : 801-805.

[13]. Behrendt, T. : A. J. O. : Jan. 1956 : 41-1 : 99-105.

or two hour intervals, the patient ignores the directions and begins to use the drops at more frequent intervals in order to relieve his pain and goes on increasing the frequency until he is using the drops every 10 to 15 minutes without relief.

This study would seem also to confirm that synthetic anesthetic agents are as capable as cocaine of producing corneal erosions.

It would seem that the loss of the anesthetic effect, the period of sensitivity directly following loss of the effect, and the subsequent prolonged period of insensitivity must be due to a lesion of the corneal nerves caused by the anesthetic agent.

From these observations, it must be concluded and emphasized that the practice of prescribing anesthetic solutions for home use by the patient is dangerous. It is a medical error to prescribe topical anesthetics for prolonged home use, and in addition to causing erosions, the anesthetics lose their effect which may lead to excessive dosage when the patient is left to his own discretion, resulting in sensory damage to the cornea.

Following clinical observation of corneal lesions caused by indiscriminate use of topical anesthetics, a study was made of the effect of various anesthetic agents on rabbit eyes. It was shown that after prolonged administration, the anesthetic effect of the agents studied was lost, and that, even after cessation of treatment, material and sensory damage persist.

14. Fixation of Corneal Grafts.

The author in tracing the tendencies in corneal graft fixation since 1930, says that at that time Elsching, who had done much valuable work, was using two overlying sutures to maintain the graft in place, arranged at right angles to each other, and inserted at the limbus.

When surgeons began to take up corneal transplantation, it was evident that many did not like the idea of using sutures to retain a corneal graft in place, and in 1932 Castroviejo advocated the use of conjunctival flaps; but in the course of the next few years he came to the conclusion that sutures were more effective, and introduced a square corneal graft with beveled edges and described a continuous suture which gave eight-point fixation, in the same way as the two crossed sutures.

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[14]. Tudor Thomas J. W. : Arch. Ophth. : July 1955 : 54-1 : 1-5.

It was, of course, quite understandable that conjunctival flaps should be tried, but in practice they were unreliable, and one could not have that sense of security with their use which was possible by using sutures.

Katzin described a single suture that gave six-point fixation, but although this method is efficient in securing a smaller graft, the eight-point fixation obtained by two crossed sutures is more efficient for the ordinary 5 mm. graft.

The use of egg membrane between the overlying sutures and the graft was originally suggested by Filatov, and revived and made widely known by Paufique. It is certainly of great advantage, and is made a part of the authors' normal routine. It diminishes considerably any damage to the graft by the overlying sutures and spreads out the pressure of the suture over a wider area. The author has not found any harm resulting by covering the graft with egg membrane in this way, and it allows one to leave sutures in for a longer period without harm.

In the early days, when no egg membrane was used, the author generally tried to remove the sutures about the seventh day, recognizing that if they were left in much longer than that, they would produce indenting, and even cutting, of the surface of the graft. This would frequently clear up in a surprising way, but in some cases it produced ulceration and opacity. Although a graft is united at the end of seven days, the union is insecure, and displacement of the graft margin can easily occur, either at the time of the removal of the sutures or soon afterward, and one cannot regard the union at that stage as being sufficiently secure to withstand possible mishaps. With the use of egg membrane, however, the sutures can be left in for 10 or 12 days, when the union is very much more secure.

Coming to more recent times, we find a tendency to cover the graft with a cap or splint, which is secured to the surrounding cornea. Pittar described a tantalum splint, and in 1952 Worcester published his observations on the use of a corneal splint. The object in view was to preserve the curvature of the graft and to reduce post-operative myopia. It was also intended to prevent the margins of the graft from becoming unduly prominent and to assist in adequate closure of the wound. Worcester first tried a total plastic cap in rabbits, but found it caused considerable opacity and loss of epithelium and evidence of damage to the cornea, in the course of a few days. He concluded that support for the graft must not interfere with adequate respiration of the cornea or with efficient circulation of its fluids. He designed a triangular plastic cap, leaving a portion of the graft surface exposed, and with its use obtained transparent grafts.

Philps also obtained successful corneal grafts with uniform curvatures by the use of a plastic splint, 12 mm. in diameter, which was secured to the cornea and removed after eight days.

Paton is of the opinion that plastic splints tend to interfere with union, and uses a small plastic cap which covers only part of the graft, protecting its central area from the pressure of the sutures.

15. Herpes Simplex Keratitis.

In the treatment of experimental herpes simplex virus keratitis in the rabbit the following results were obtained :

1. Somatotropic hormone by subconjunctival injection and applied topically was ineffective, but prophylactic and concurrent subcutaneous injections had a possible transient retarding effect up to the third day of infection.

2. Deoxycoticosterone in prophylactic and concurrent intramuscular injections or in topical applications was ineffective.

3. Estrogenic or androgenic hormone injections given prophylactically or concurrently had no effect.

4. Influenza virus vaccine injections given prophylactically or concurrently had no effect.

16. Keratitis and Scleritis with Felty's Syndrome.

A case report and discussion of a scleritis and keratitis associated with Felty's syndrome are presented. It is believed that this report is the first in the literature that shows this association.

Felty's syndrome consists essentially of chronic rheumatoid arthritis, splenomegaly, and leucopenia. In the reported case the left eye developed scleromalacia perforans and later an uncontrollable central ulcer of the cornea, which perforated and went on to enucleation. Later, the right eye became irritable and developed a superficial punctate keratitis, which progressively worsened despite conventional therapy. It was felt that the leucopenia associated with the Felty syndrome lowered the patient's resistance to infection, and splenectomy was performed (whole blood transfusion, which had previously been

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[15] Hallett, J. W., et. al. : Arch. Ophth : Oct. 1955 : 54-4 : 573-79.

[16] Ostriker, P. J., et al. : Arch. Ophth. : Dec. 1955 : 54-6 : 858-62.

administered, had produced only a very transient beneficial effect.) Following the splenectomy, the white blood cell count promptly rose above normal, the keratitis in her right eye was ameliorated, and the best corrected visual acuity improved from 20/200 to 20/50, as of the date of this report. Histopathologic study of the enucleated left eye did not show any specific rheumatoid features.

It is believed that the ocular involvemet in this case was severert than might be expected with the ordinary rheumatoid arthritis because of the associated leucopenia. In the future it might be advisable to examine the eyes periodically in cases of Felty's syndrome and to keep splenectomy in mind where a scleritis and/or keratitis appears uncontrollable and threatens destruction of the eye.

17. Secondary Keratitis.

1. The causes of metaplasia of the mucous epithelium of the conjunctiva into cornified epithelium are discussed.

2. Thirteen eyes in eight patients are described in which keratitis resulted from keratinization of the tarsal conjunctiva. The keratitis is thought to be due to mechanical abrasion of the corneal epithelium by the keratin-containing cells.

3. Medical treatment of keratinization of the tarsal conjunctiva was usually unsuccessful in the cases reported and surgical removal of the lesion had to be used.

4. A surgical technique is described for creating a new mucocutaneous junction of the lid margin and for correcting entropion.

DIAGNOSIS

18. C-Reactive Protein in Ophthalmology.

1. A historical review is presented of the C-reactive protein test and its possibilities in ophthalmic diagnosis are discussed.

2. A total of 103 cases were analyzed in which the blood serum had been examined for the presence of C-reactive protein.

3. Patients with active uveitis showed a statistically significant elevation of their C-reactive protein antiserum blood as compared to patients with other ocular disease (for example, glaucoma) or those without ocular disease. Approximately

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[17]. Maumenee, A. E. : A. J. O. : March 1956 : 41-3 : 477-87.

[18]. Wolkowicz, M. I., et al. : A. J. O. : June 1956 : 41-6 : 942-50.

75 percent of the positive uveitis cases had a systemic disorder that accounted for the elevated C-reactive protein antiserum level.

4. Elevated C-reactive protein antiserum tests were found only in experimental uveitis induced by bacterial intracameral inoculation and not after other foreign protein intracameral injections.

19. Diagnosis Of Malignant Melanoma.

In a microscopic study of subretinal fluid in globes with retinal detachment secondary to malignant melanoma, a high incidence of free floating tumor cells was found. These cells may be recovered by aspiration of fluid and can be positively identified by microscopic examination provided a microscopist exceptionally well versed in the cellular characteristics of subretinal fluid is available. Failure to identify the presence of a tumor by this method has promoted subsequent externalization of a previously-confined neoplasm. Because of the technical difficulties involved and the obvious danger of extraocular extension of unrecognized tumors, this procedure is not recommended as a diagnostic aid.

20. Erg In Vitamin A Deficiency.

1. An electroretinogram can be successfully recorded in most of the human subjects above the age of 7 years, while general anesthesia is usually necessary below that age.

2. The b-potential of a normal Indian adult is 0·32 mv; and that of a child between the ages of 7 and 15 years is 0·31 mv.; and that below the age of 7 years, 0·26 mv.

3. The electroretinogram remains normal so long as the patient suffers from xerosis alone and the vitamin A content of the blood is above the minimum threshold level.

4. The electroretinogram is completely extinguished as soon as the vitamin A deficiency leads to the manifestation of night blindness and the vitamin A content falls below the minimum threshold level.

5. The absolute minimum vitamin A requirement in human beings must be of a very low order. The vitamin A threshold

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[19]. Christensen, L. and Rowen G. E.: Arch. Ophth.: Oct. 1955: 54-4: 477-80.

[20]. Dhandha R. P.: Arch. Ophth.: Dec. 1955.: 54-6: 841-49.

is in the neighbourhood of 20 I. U/100 cc. of plasma in children below 15 years of age and a little higher in adults.

6. Children are much more susceptible to vitamin A deficiency than are adults and develop night blindness, as well as lose the electrical response in the retina, much more rapidly than adults.

7. Night blindness as a manifestation of vitamin A deficiency is much more frequent in children than in adults.

8. Children respond to treatment much more rapidly than adults.

(i) Xerosis is an indirect manifestation of vitamin A deficiency rather than a direct one.

(ii) Night blindness is a direct result of vitamin A deficiency.

(iii) A functional defect of the retina is enough to lead to an extinguished electric response, and a pathological and structural change is not a necessity.

(iv) An extinguished electroretinogram is a reversible phenomenon.

21. Gonioscopic Changes in Accomodation.

The classical changes in position and contour of the structures of the anterior segment of the eye during accommodation are enhanced by observation in slit-lamp gonioscopy.

Some new observations are reported. One relates to the trabecular zone, which presents subtle, though definite changes in texture and colour whenever a change in adjustment of the eye occurs. The other relates to the periphery of the lens, where the optical section of the posterior lens capsule shows that the angulation between the central and the peripheral part of the capsule becomes more acute during accommodation, owing to flattening or recurving of the portion just central to the so-called ligamentum hyaloideo-capsulare. A measurable change is observed in the slit-lamp section of the periphery of the vitreous, indicating a reduction of tension during accommodation. Lastly, an optically empty space is seen in the region of the canal of Petit during accommodation.

All observations tend to support the Helmholtz theory of accommodation.

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[21] Burian, H. M. and Allen L. : Arch. Ophth. : July 1955 : 54-1 : 66-72.

Further studies of the phenomena observed in the trabecular zone are necessary. It is possible that they may throw light on the question as to whether accommodation plays a beneficial or a detrimental role, or no role at all, in eyes predisposed to glaucoma.

22. H-R-R Pseudo-Isochromatic Plates.

The new Hardy-Rand-Rittler (H-R-R) pseudo-isochromatic test for defective color vision is a simple useful aid in the diagnosis of past episodes of acute or chronic retro-bulbar neuritis of multiple sclerosis. When pallor of the optic disc or other residual signs are present after an episode, the test is a dependable means of confirming the diagnosis. In cases in which the visual acuity, optic discs, and visual fields are normal, the H-R-R plates often give the only objective evidence of past involvement with retrobulbar neuritis.

23. The Priscoline Provocative Test.

In 1954 Leydhecker reported the use of subconjunctival Priscoline (2 benzyl imidazoline hydrochloride) as a provocative test for primary chronic glaucoma. He found it to be positive approximately twice as often as was the water test in eyes with known primary glaucoma but was not as often positive as with Vasculat.

A study of the Priscoline test on a small number of normal eyes revealed an average rise of 4·9 mm. Hg. (Schiotz), a maximum rise of 8·0 mm. Hg. and a maximum tension of 30·3 mm. Hg. This means Leydhecker's criteria of a positive Priscoline test are too high. At least, it indicates that further evaluation of the criteria in this test is needed.

A study of the results of the Priscoline test in 30 unoperated eyes with known simple glaucoma showed it to be positive in 46·6 per cent of these eyes when our criteria were used and in only 26·6 percent when Leydhecker's criteria were used.

In six successfully operated eyes with simple glaucoma, the test was negative in all cases. The low average increase in tension of 3·3 mm. Hg. indicates that the filtering blebs enable

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22. Steinmetz, R. D. and Kearns T. P. : A. J. O. : May 1946 : 41-5 : 833-837.

23. Sugar, S. and Santos, R. : A. J. O. : Oct. 1955 : 40-4 : 510-14.

the operated eyes to handle a possible increase in aqueous volume even better from normal eyes.

Certain possible complications of the test are described. It is not a test which can comfortably be given to patients in office practice. It is suggested that it may be useful in cases in which the water test cannot be tolerated. It is our opinion that the water test, with all its drawbacks, remains the most convenient provocative test.

24. Visibility of Haidinger Brushes.

The visibility of the Haidinger brushes was determined for 136 normal eyes, and for 241 eyes with ocular disease, amblyopia ex anopsia, or congenital anomaly.

1. The HB scores were subnormal in the great majority of the eyes having macular disease. Low scores were also noted in eyes with various forms of optic neuropathy, but only if visual perception was impaired in a major portion of the central field in which the brushes would normally appear.

2. In high degrees of amblyopia ex anopsia with vision of 20/100 or less, the HB scores were normal in some instances, markedly reduced in others. The ability of the amblyopic eye to perceive the brush pattern probably depends primarily upon the extent of the central area in which function is depressed in monocular vision.

3. Subnormal brush scores were sometimes noted as a result of a cataract or an advanced keratoconus. The reduction in visibility of the entoptic pattern by such defects of the ocular media is probably the result of scattering, absorption, and partial depolarization of the incident light.

4. Seven subjects whose eyes were apparently free of any form of ocular disease saw either no brush pattern whatsoever or a very incomplete form of the normal pattern. Other findings suggest that some congenital anomaly of the macular structures was responsible for the absence of the normal entoptic pattern.

5. Because of the many different causes of subnormal HB scores, the test is of only limited value in differential diagnosis. A markedly subnormal brush score in association with a minima

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[24]. Sloan, L. L. and Naquin, H. A. : A. J. O. : Sept. 1955 : 40-3 : 393-406.

field defect is however strongly suggestive of a macular rather than an optic nerve lesion. Central serous retinitis in particular can be associated with an obviously subnormal HB score at a stage at which the condition could easily be overlooked on routine examination. In a cataractous eye with low vision, a normal HB score can be considered as reliable evidence of an intact macula.

6. The chief merits of this new test as a supplement to standard procedures are : (a) it is rapid and simple, (b) it is not influenced by uncorrected ametropia, and (c) it gives reliable results in patients whose unsteady fixation interferes with detection of a central field defect.

GLAUCOMA

25. Aqueous Pathways in Glaucoma.

A microscopic study of the aqueous veins in glaucomatous eyes reveals that it is probable that some cases of chronic simple glaucoma are secondary to hypertrophy and sclerosis of the sclera resulting in closure of the veins and obstruction to aqueous outflow.

26. Closed- Angle Glaucoma.

Attention is drawn to the fact that the angle of the anterior chamber is shallower above than elsewhere. It is suggested that, in eyes which are in danger of ultimately developing closed-angle glaucoma, irido-corneal contact starts above long before there are any symptoms, and progresses slowly downwards as the lens increases in size with age. When the free angle becomes reduced nearly to the critical amount for adequate aqueous outflow, the premonitory symptoms are produced by transient increases in the area of trabeculae covered by iris. Provided that there has been no inflammatory reaction in iris or cornea, this contact superiorly may remain for years without being converted into permanent synechiae. These new conceptions make it easier to understand total closure, and hence acute closed-angle glaucoma, resulting from sudden occlusion of the small amount of residual angle left open below.

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[25]. Theobald, G. D. and Kirk, H. Q. : A. J. O. : Jan. 1956 : 41-1 : 11-21.

[26]. Phillips, C. I. : B. J. O. : March 1956 : 40-3 : 136-143.

Measurements of the depth in various parts of the shallow anterior chamber before and after peripheral iridectomy have shown that, while the lens remains stationary, the iris sinks backwards away from the cornea.

It is suggested that the main factor causing the anterior chamber to be shallower above is greater peripheral flattening of the cornea in that region. This, in turn, may be due to pressure of the upper lid.

A case history is described as an example of the occasional resolution of a closed-angle glaucoma by marked shortening of the superior segment of the iris. The aqueous is thus allowed to escape through the pupil at 12 O'clock thereby eliminating the iris bombe'. The vertically oval pupil in acute closed-angle glaucoma may be an "attempt" by the congested eye to achieve this state.

27. Cyclodiathermy in Glaucoma.

The authors admit that the number of cases is small and that the follow--up period in "successful" cases is not long. However, it is not necessary to lose a "hatful of eyes" to recognize the fact that cyclodiathermy is not a cure-all for glaucoma. Certainly it seems contraindicated in the acute, congested, narrow-angle type of glaucoma. It does have some therapeutic value in congenital buphthalmos. It may be considered in an aphakic glaucoma. When all other procedures have failed, it can be used as a last resort if it is fully realized that there is danger of sympathetic ophthalmia.

In a brief series of 17 operations on 14 eyes, cyclodiathermy as advocated by Castroviejo, was used. The results do not justify including this operation with such standard procedures, as iridencleisis, trephination, and sclerectomy.

28. Evaluation of Glaucoma Surgery.

Postoperative results following certain surgical procedures employed for the control of glaucoma have been evaluated from the clinical records of five hospitals, and from the records of private patients. The primary purpose of the study was to evaluate certain operations over a long period of time to determine in what percentage

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[27]. Covell, L. L. and Batungbacal, R. T. : A. J. O. : July 1955 : 40-1 : 77-82.

[28]. Berens, C. : Arch. Ophth : Oct. 1955 : 54-4 : 548-63.

of the eyes the procedures were employed as a primary operation; the number of eyes in which the various types of glaucoma were controlled under 25 mm. Hg., with and without miotics; the visual results; the complications encountered, and the number of patients who required additional surgery.

It has been found that most operations produced excellent results in patients followed postoperatively for relatively short periods of time, e. g. from one to two years, but that in those observed for several years additional operations were required to control tension in a larger number of eyes. The decrease in the percentage of eyes in which tension was controlled, over a reasonably long postoperative period was found to be particularly striking following cyclodiathermy. Of 72% of 150 eyes in which cyclodiathermy was used as a primary procedure and the postoperative observation period was 7 to 14 years tension was controlled in only 1% without miotics and 21% with miotics, making a total of 22% in which tension was controlled under 25 mm. Hg. of 114 eyes in which cyclodiathermy was employed as a primary procedure, 71% were observed for from one to six years postoperatively. In 8% of these eyes tension was controlled without miotics and 27% with miotics, making a total of 35% in which tension was controlled under 25 mm. Hg. Vision in 223 retained eyes following anterior cyclodiathermy was improved in 6% and unchanged in 11%, making a total of 17% in which preoperative vision was retained or improved after operation.

Postoperative complications following anterior cyclodiathermy in 223 retained eyes observed for from 1 to 14 years were as follows : atrophic globes (11%), phthisis bulbi (4%), hemorrhage into the anterior chamber (9%), vitreous hemorrhage (3%), uveitis (4%), cataract (2%), retinal detachment (1%), acute iritis (1%), iridocyclitis (3%), absolute glaucoma (6%), and bullous keratitis (1%). Of the entire series of 264 eyes, 16% were enucleated.

The results of retrociliary diathermy in 127 eyes, observed for from one to four years, are most discouraging. Used as a primary procedure in 81% of the eyes tension was controlled under 25 mm. Hg. in only 4% of the eyes without miotics and in 22% with miotics, making a total of 26% in which tension was controlled. Thirty percent of these eyes required additional surgery, and 10% of the eyes were enucleated. Vision in the retained 114 eyes was improved in 16% and remained unchanged in 10%. Of the retained 114 eyes, 6·5% became atrophic; phthisis bulbi occurred in 2%; hemorrhage into the anterior chamber, in 5·5%, vitreous hemorrhage, in 1%; iridocyclitis, in 1% and panophthalmitis in 2%.

When these findings are compared with the results for 239 eyes observed for from two to nine years in which cycloelectrolysis was employed for all types of glaucoma, it seems that the chemical method (cycloelectrolysis) is more effective, with less serious complications, than the thermal (cyclodiathermy) method. Tension was controlled in 32% of the 239 eyes without miotics and in 33% with miotics, making a total of 65% in which tension was controlled under 25 mm. Hg. It is important to note that cycloelectrolysis was employed as a primary procedure in only 35% of these eyes, and additional surgery was required in 19% of this group. Six percent became atrophic; phthisis bulbi occurred in one case; retinal separation, one case; irido-cyclitis, in three cases, and absolute glaucoma, in 3% of the eyes.

Pathologic section of rabbit eyes treated by means of cyclodiathermy showed necrosis and cellular infiltration into the episcleras In some instances there was a rupture of the sclera on the treated side. The iris root and ciliary processes were engorged with blood and the pigment epithelium was disturbed in some areas. The nonpigmented epithelium was absent in most sections.. There were marked changes in the ciliary processes, but these were more marked following retrociliary diathermy.

An insufficient number of eyes were operated upon by mean of posterior cycloelectrolysis to permit evaluation of this procedure.

Following anterior cycloelectrolysis, pathologic sections of rabbit eyes showed loss of the nonpigmented epithelium of the ciliary processes in certain areas and partial destruction of the pigmented epithelium.

Of the two most-used procedures designed to diminish the formation of aqueous, cyclo-electrolysis seems to be more effective than cyclodiathermy, with fewer postoperative complications. The long-range prognosis following anterior cyclodiathermy is discouraging and the results of retrociliary diathermy are poor, with a high percentage of atrophic eyes resulting from both these procedures. Because most increased tension results from diminished outflow, the hypotensive effect of operations like cyclodiatherm.

and cycloelectrolysis is often of short duration: these procedures should be reserved for cases in which filtering operations are contraindicated, or in which outflow following a filtering procedure is mildly inadequate.

29. Glaucoma Treated by Goniopuncture.

Goniopuncture has been used for the treatment of 13 eyes with glaucoma. Eight had congenital glaucoma: two had juvenile glaucoma: two had cogenital aniridia with glaucoma; and one had glaucoma due to peripheral anterior synechiae following repeated surgery for the treatment of cogenital cataract. All eyes were characterized by deep chambers and open anterior chamber angles except in the infant with secondary glaucoma and a 25 year-old patient with advanced congenital glaucoma,. The operation failed in two eyes with congenital glaucoma and was of questionable value in two eyes with congenital glaucoma. Of the latter two eyes, no statement of proof can be made as to the control of the tension, but the patient showed a clinical improvement, as indicated by clear corneas and lack of photophobia and blepharospasm. The tactile tension in each eye, although unreliable, seemed normal. The operation was successful in the nine remaining eyes. Eight of which have been followed for a period of from 7 to 14 months For the present follow-up period, this represents a 64% success in controlling the ocular tension. The two eyes with clinical improvement but no follow-up tensions are not included as successful.

Of interest is the number of procedures necessary on each eye to control the tension. Each eye with congenital aniridia required only one goniopuncture to control the tension. The two eyes with juvenile glaucoma required two punctures each to control the tension. The cause for failure of the first puncture was not apparent. Advanced congenital glaucoma in a 25 year-old woman, who had been subjected to numerous other operative procedures, was controlled with two goniopunctures done at the same operation. Two punctures were attempted at this time because there were only two small areas in the anterior chamber angle which were free of peripheral anterior synechiae. The infant with secondary glaucoma following needling of a con-

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29. Tyner, G. S., and Swets E. J., : Arch. Ophth. : July 1955 : 54-1 : 50-65.

genital cataract likewise received two punctures, but at different operations. Those two punctures were made in the only two areas which were not closed by peripheral anterior synechiae. It could be observed that the first puncture failed because the operative procedure was faulty. The puncture was made at a point above Schwalbe's line rather than in the trabecular space. It is interesting to note that the second procedure was successful despite the fact that the patient sustained a traumatic hyphema two days after surgery, due to a blow on the eye.

A 13-month-old infant with bilateral congenital glaucoma had been subjected to cyclodialysis and irridectomy on both eyes prior to this survey. One eye, which was successfully controlled was operated on twice by goniopuncture, and one eye, which was not controlled, was operated on twice. The result of the third puncture on the latter eye has not been finally evaluated. The cause for failure of the first puncture on each eye is closure by peripheral anterior synechiae. One 5-year-old child with advanced congenital glaucoma in one eye had not had any previous surgery. This eye required three goniopunctures before the tension was controlled. The cause for failure of the two first punctures could not be determined. Both punctures appeared open by gonioscopic examination, prior to the last procedure.

These results are in accord with Scheie's original observation that the stage of glaucoma seems of little importance in influencing the outcome of this operation. Eight eyes operated on were in the advanced stage before the operation was attempted. Five were successfully treated: one was a failure, and the results in two were of doubtful value. Five of the operations were in the early stage. Four were successful, and one failed. The failure occurred in one eye which was not subsequently controlled by goniotomy, acetazoleamide, and miotics.

From this short experience, it seems apparent that one of of the principal merits of this procedure is that it can be employed in advanced cases with little risk of serious haemorrhage, damage to the lens, or severe postoperative reaction. A further advantage in this procedure is that its repeated employment does not preclude the subsequent use of a goniotomy or a filtering operation should the repeated attempts with goniopuncture fail to control the tension.

Topical hydrocortisone postoperatively may aid in reduction of tension in cases with a secondary rise in tension due to plasmoid aqueous. Pilocarpine instead of atropine may be indicated postoperatively to prevent the formation of peripheral anterior synechiae.

Goniopuncture was effective in controlling the ocular tension in 9 out of 13 eyes.

The stage of the disease was not a significant factor in the success of the operation in this series.

The operation was successful in patients ranging from 1 to 25 years of age.

Repeated operations were necessary in some eyes to control the tension despite the apparent patency of previous punctures. The cause for failure of apparently open punctures remains obscure.

Peripheral anterior synechiae following two punctures and faulty placement of a puncture above Schwalbe's line in one case were recognized as causes for failure.

No operative complications were encountered in 22 goniopunctures. No serious postoperative complications were recognized. Temporary rises in tension postoperatively were not unusual.

The authors do not feel that final evaluation can be made in any of the cases until further follow-up can be obtained.

30. High Tension in Glaucoma.

Eight cases are reported not to chart a course for the treatment of glaucoma, but rather to induce greater doubt in our minds that the modern concept of glaucoma therapy is the only true one, and that any deviation from orthodoxy in treatment is fraught with danger to the patient.

The intraocular pressure has remained elevated in these eight patients over a long period of time for a variety of reasons. In spite of this, the visual capacity of the eyes has remained fairly good and entirely consistent with the aims of the Glaucoma Clinic. When measured with the results of glaucoma therapy in private patients, the comparison is not unfavourable.

It is not suggested that we should abandon our attempts to reduce the tension whenever possible, nor infer that there is any

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[30]. Rones, B. : A. J. O. : March 1956 : 41-3 : 408-19.

beneficial effect from a prolonged elevation of the pressure. However, it is obvious from this series that some eyes can tolerate such elevations of pressure over prolonged periods of time, and that it is the duty of the mature clinician to evaluate all the factors involved, of which tension is only one aspect.

There should be no panicky resort to surgery merely because the pressure readings of an instrument are above a certain level, nor should surgery be indulged in by the enthusiast who believes that an operation should be performed as soon as the diagnosis of glaucoma is made to "prevent" further deterioration. The decisions required of the clinician in the proper handling of glaucoma are just those that are cultivated by years of observation and contemplation and cannot be replaced by any of the newer tests or techniques that have come into use.

31. Mortality Rates in Glaucoma.

Comparison of the relative mortality rates for a group of glaucoma simplex patients and a group of congestive glaucoma patients with those appertaining to the general population reveals no significant differences. From the ocular point of view, the patients who died resembled in every way those who survived. This seems to indicate that glaucoma patients do not suffer from any excess of the normal process of aging or of lethal vascular disease.

32. Pathogenesis of Congenital Glaucoma.

The gonioscopic findings in the normal angle have been traced from infancy through adult life and have been found to correspond to the microscopic anatomic findings.

Gonioscopically a transparent membrane has been observed which has a shagreened surface and clothes the angle, extending downward from the line of Schwalbe over the trabeculum and the uveal meshwork. In infants its plane is vertical. It is assumed to represent the endothelium.

In older children the optic section extending from the shagreened surface to the scleral wall gradually diminishes in size along with regression of the uveal meshwork and takes on the conformation of the adult angle.

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[31]. Bennett G. : Arch. Ophth. : Nov. 1955 : 54-5 : 637-40.
[32]. Barkan O. : A. J. O. : July 1955 : 40-1 : 1-11.

The configuration of the adult angle is influenced by functional factors, such as relative seclusion of the pupil with iris bombe', as well as by anatomic factors.

A prominent blood-filled Schlemm's canal is readily seen in all normal infants upon application of the contact glass. In adults it is more difficult to elicit and is relatively smaller in size. In congenital glaucoma the canal is not easily observed except in eyes in which the pressure has been normalized and the obstructive tissue hiding it has been severed by goniotomy. It is frequently found anatomically defective though functionally adequate to normalize pressure.

Evaluation of the gonioscopic findings in congenital glaucoma before and after goniotomy shows the anomalously differentiated trabeculum to be less permeable than in the normal eye as has been assumed from histologic studies.

Gonioscopy and the results of goniotomy show that Schlemm's canal is initially present, albeit often defective, in most cases of congenital glaucoma. It can become functionally effective provided that aqueous is given access to it at an early stage. The structures in the angle in congenital glaucoma are thus related to the disturbance of function and to the action of goniotomy.

The urgent need of early diagnosis and early goniotomy is stressed from the anatomic point of view. Early operation is imperative also from the functional point of view in order to reverse the corneal cloudiness and encourage the development of visual acuity.

33. Phacolytic Glaucoma.

Glaucoma of the type in the present study is a pathologic entity clinically recognizable, readily preventable, and often curable by cataract extraction.

The authors propose the name " phacolytic glaucoma " to describe this malady. It is a concise term denoting the basic pathologic process, namely dissolution of the lens. Some of the other terms previously used to describe it are :-(1) lens induced glaucoma, (2) phaco-genetic glaucoma, (3) phacogenic glaucoma, (4) glaucoma associated with Morgagnian cataract, (5) glaucoma associated with hypermature cataract, and (6) glaucoma due to spontaneous rupture of hypermature lens.

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[33]. Flocks, M. et al. : Arch. Ophth. : July 1955 : 54-1 : 37-45.

Lens-induced glaucoma, phacogenetic glaucoma, and phacogenic glaucoma are objectionable terms in that they provide, no clue to the way in which glucoma is related to pathologic changes in the lens. These names might be equally applicable to the glaucoma seen in association with exfoliation of the lens capsule, spherophakia, endophthalmitis due to lens substance, and intumescent cataract, all of which may be confused with phacolytic glaucoma. The basic mechanism in each of these is different. The mechanism of glaucoma due to exfoliation of lens capsule, like that due to liquefied lens cortex, is essentially obstruction of the intertrabecular spaces by particulate matter. In exfoliation it is the flakes of lens capsule that produce the obstruction, while in phacolytic glaucoma it is a combination of phagocytic cells and esaped Morgagnian fluid. In spherophakia and intumescent cataract glaucoma is due to pupillary block. Glaucoma associated with lens-induced endophthalmitis may be due to anterior or posterior synechiae or to obstruction of the chamber angles by inflammatory exudate. In the latter situation, the pathologic changes differ from those of phacolytic glaucoma in the character of the inflammatory exudate. That in lens-induced endophthalmitis consists of large numbers of lymphocytes, plasma cells, epithelioid cells, and polymorphonuclear leucocytes, while the typical reaction in phacolytic glaucoma is a bland outpouring of macrophages.

In the authors' experience, the "chemical irritation" theory of glaucoma associated with hypermature cataract confuses more than it enlightens.

All too often this form is regarded as a type of hypersecretion glaucoma, the so-called toxic effect being on the ciliary body. The authors do not deny that there is chemical irritation, but they believe that its main deleterious effect is the histiocytic response and consequent plugging of trabecular spaces by macrophages.

Likewise, they doubt A. Knapp's suggestion that irritation of the ciliary body by the bouncing lens nucleus of Morgagnian cataract accounts for many cases of phacogenic glaucoma. Also, they believe that capsular rupture is not an essential factor and that evidence for its occurrence is lacking in many of the reported cases.

Comprehension of the pathologic basis for these different types of lens-induced glaucoma is not without therapeutic significance. In phacolytic glaucoma, the authors believe that after delivery of the lens, the anterior chamber should be irrigated in an effort to remove as much Morgagnian fluid and as many macrophages as possible.

Three of the outstanding clinical features of this group of patients were (1) the sudden onset of glaucoma in an eye that had been blind from cataract for many years, (2) the patient's advanced age, and (3) the almost constant observation of good vision and normal tension in the opposite eye. Pathologically there was evidence that the cataracts had been liquefied for a long time; yet the retinas and optic nerve in a significant number were well preserved. This observation is support for the belief that glaucoma was of recent origin.

How, then can the variable, though usually sudden, onset of glaucoma be explained ? At least three factors seem to be at work. 1. The rate at which lens fluid escapes into the anterior chamber. The sudden onset of symptoms is not necessarily indicative of rupture of the lens capsule. In the majority of the authors' cases pathologic evidence of rupture was lacking. Probably, escape of lens fluid depends upon (a) the degree of hydrolysis of lens protein into smaller, diffusible molecules, and (b) degeneration of lens capsule, so that it becomes more permeable. 2. The age of the patient. In 1937, Howard Knapp postulated that the drainage facility of the elderly patient's eye was less efficient than that of more youthful persons. Other workers have observed that old patients do not handle escaped lens substance as well as young ones. In the authors' younger patients the course was insidious or intermittent, in contrast to the acute onset in older patients. 3. The presence of co-existing eye disease, such as chronic simple glaucoma, siderosis bulbi, or chronic iridocyclitis. This factor was relatively less important than (1) and (2), but probably the reason this type of glaucoma develops in some young patients is that their filtration mechanisms have been rendered less efficient by other eye disease. It is significant in this regard that the four patients in the series below the age of 50 had had intraocular foreign bodies and two had well-developed siderosis bulbi.

Even though the correct diagnosis was made in 21 cases, the physician did not elect to extract the lens which is the seat of the trouble. This, then is a plea for cataract extraction.

Although the eye is suffering from an acute, and often violent, disturbance and the patient says that he has been " blind " in this eye for many years and shows faulty light projection, cure and salvable vision may be the reward if cataract extraction and anterior chamber irrigation are done.

A study of 138 eyes enucleated because of glaucoma associated with hypermature cataract establishes this type of glaucoma as a clear-cut pathologic entity. Liquefaction of the lens cortex and degeneration of the lens capsule and epithelium permit escape of the lens liquid into the anterior chamber. The lysed cortical material evokes a histiocytic response. Macrophages, swollen with phagocytosed lens material, block the filtration apparatus, to produce acute glaucoma. The authors propose the name " phacolytic glaucoma " for this condition, for the reason that it is descriptive of the basic pathology.

Review of the case histories reveals characteristic clinical features. The acute onset of glaucoma in the cataractous eye of an old person with good vision in the other eye, particularly if the other eye is aphakic, should lead to serious consideration of phacolytic glaucoma. A deep anterior chamber, lack of synechiae, and lack of keratic precipitates in the presence of aqueous flare and cells lend further support to this diagnosis.

Comprehension of the pathology and pathogenesis of phacolytic glaucoma should lead to the correct treatment of this surgical emergency, namely, cataract extraction and irrigation of the anterior chamber. Moreover, this type of glaucoma is completely preventable by cataract extraction before the development of hypermaturity.

34. Primary Glaucoma.

Seventy-five years ago the essential clinical facts regarding primary glaucoma were well known and described, but the problem of its etiology has, to this date, been unresolved. However, in the past 10 years, especially much scientific information has been accumulated, particularly along the physico-chemical lines prophesied by Duke-Elder 25 years ago.

2. We know much about how the aqueous is formed and eliminated, and a great deal about the physiochemical mechanism of the maintenance of normal intraocular pressure.

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[34]. **Vail, D. : A. J. O. : Feb. 1956 : 41-2 : 207-31.**

3. We suspect that the control of the normal intraocular pressure is a function of the brain, presumably the hypothalamus. As one evidence for this belief there is the interesting and curious behavior of the patterns in the normal individual of the bilaterally synchronous diurnal variations of intraocular pressure and its relationship to the blood supply to the uvea, particularly in the ciliary body.

4. Primary glaucoma is a complexity of diseases whose chief symptom is the elevation of the intraocular pressure. It is manifested in two forms which are probably entirely separate disease entities.

5. Chronic simple (open-angle) glaucoma is characterized by rhythmic wide and uncontrolled swings of the diurnal intraocular pressure, without other obvious clinical signs until the disease is far advanced. It may occur without abnormal elevation of pressure (low-tension glaucoma).

Disease of the blood vessels resulting in disturbance of the arterial but especially the venous pressure is undoubtedly a factor in its etiology and especially so in its evolution. The maintenance of adequate nutrition, notably to the optic nerve, ciliary body, and retina, is increasingly affected as the disease progresses, often in spite of a successful filtration operation.

In addition, there is increasing and impressive scientific evidence that resistance to the outflow of aqueous is always present and increases with the advancement of the disease. For this reason there exists the laudable controversy between the neurovascular and the mechanical schools of thought. Whether there exists also a disease or lesion in the " control center " in the brain, wherever that may be, is as yet unproved.

6. Acute inflammatory (narrow-angle) glaucoma is, the author firmly believes, an entirely different condition, for the reasons already outlined. Here there is undoubtedly a strong neurovascular and psychogenetic background but the narrow angle and its ease of closure is primarily the site involved.

There is good evidence that the narrow angle of affected individuals is an hereditary and familial, anatomic and architectural feature. As such, any mechanical factors existing within such an eye, as well as a neurovascular crises, are capable of precipitasing an acute attack. The author suspects that in many cases the neurovascular crisis of uveal erection is the result and not the cause of the acute closure of the angle.

Whether or not this is true for all cases is for future studies to decide. The author hopes that the evidence presented by him is strong enough to convince all that acute inflammatory glaucoma is a disease entity, entirely separate in all of its factors except elevation of intraocular pressure from chronic simple glaucoma.

7. If such a concept can be agreed upon, the way for future studies is more clear, for the confusion in the past between these two entities has been a great hindrance to the understanding of these two ocular diseases and the proper and suitable medical and surgical treatment of each.

8. The advancement of our knowledge, as the result of modern scientific facilities and apparatus, has helped enormously in our approach to the fundamental problem of early diagnosis, particularly by the ophthalmologist who has to work alone in his office practice. More thought must be given to this important phase of the problem.

9. The prospects for solving the thorny problems of the primary glaucomas, in the light of modern trends of thought and work are exceedingly bright and hopeful.

35. The Second Eye in Acute Glaucoma.

Eighty-nine percent of 27 patients who received no prophylactic treatment or who took miotics only intermittently had an acute attack in the second eye at some time after the initial attack in the first eye. This incidence is comparable to that reported by Goldberg and supports the general statement of text books and monographs that the second eye is especially prone to acute attack in primary, shallow-chamber angle glaucoma.

In 20 patients who took miotics continuously 40 percent had an acute attack in the second eye. This is less than half the frequency found in the poorly treated group but still leaves a large proportion of cases subject to attack in the second eye.

In recent years some authorities have advocated prophylactic iridotomy as a more effective preventive measure in the normal second eye. Chandler now advises " prophylactic peripheral

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35. Winter, F. C. : A. J. O. : Oct. 1955 : 40-4 : 557-58.

iridotomy for the fellow eye for all young and middle-aged patients with acute glaucoma." Scheie recommends surgery for the second eye without waiting for an acute attack in this eye.

Some estimate of the time interval to be expected between the attack in the first eye and that in the second eye is gained by finding in this study that the attack rate in the second eye was 62 percent in five years. This suggests that prophylactic iridotomy is especially indicated in the younger patients suffering an acute attack in the first eye.

1. Eight-nine percent of 27 patients who took miotics intermittently or not at all suffered an attack of acute shallow-chamber angle glaucoma in the second eye.
2. Forty percent of 20 patients who took miotics continuusly had an attack in the second eye.
3. Sixty two percent of the attacks in the second eye occurred within five years of the first attack in the first eye.
4. Preventive treatment of the sound second eye in acute congestive, shallow chamber angle glaucoma should include either continuous miotics or prophylactic peripheral iridotomy.

36. Therapy of Congenital Glaucoma.

Sixteen patients had the operation of goniotomy and goniopuncture alone or in combination performed on them. A total of 25 eyes were operated on. There were eight patients in the first group, treated by goniotomy. One eye of one patient in Group 2, which had only one goniotomy is included in Group 1 for statistical purposes, making a total of 13 eyes. In this group there were nine successes and four failures.

In Group 2 there were six patients for whom goniotomy was not successful and it was necessary to do goniopuncture or the combined operation. There were nine eyes in this group; six were treated successfully and three unsuccessfully.

The two patients in Group 3 were treated only with goniopuncture. Treatment was successful in the eye of a patient with unilateral glaucoma. Treatment was only partially successful in the other patient in that, while the visual loss was arrested, the tension was not well controlled.

The results of treatment were, of course, much better when the disease was detected early. Ten of the eyes in this series

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36. Robertson, E. N. : Arch. Ophth. : July 1955 : 54-1 : 55-58.

showed moderate to marked buphthalmos and optic atrophy, and only 3 of these eyes were cured. However treatment was completely successful in 13 of the 15 eyes which were non-buphthalmic.

Much has been written concerning the presence of mesoblastic tissue blocking the trabecular portion of the angle in congenital glaucoma. In the author's experience it has been difficult to detect, and he agrees with Scheie in his statement that he noted little, if any, difference in the appearance of the angles of eyes with congenital glaucoma and those of normal children of the same age. If the presence of mesoblastic tissue in the angle is ruled out, then the operation of goniotomy does not remove a mechanical obstruction, and the good results following its use will have to be explained in some other way..

As stated before, there are many reports on successful goniotomies, but except for Scheie's reports, and an earlier one of the author not a great deal has been written on successful goniopunctures. In his opinion goniotomy is the operation of choice in most cases of congenital glaucoma, particularly the early ones, but there are a significant number of cases in which goniotomy alone is not successful and in which goniopuncture or the combined operation is then required. Both these operations are safe, are reasonably easy to perform, can be repeated several times, and do not change the appearance of the eye.

The cases of 16 patients with congenital glaucoma treated by goniotomy, goniopuncture, or a combined goniotomy and goniopuncture are reported., Twenty five eyes were treated. Treatment was successful in 16 eyes, unsuccessful in 7 eyes, and partially successful in 2 eyes.

37. Tonography in some Provocative Tests.

1. The water-drinking test was performed on 39 normal eyes. None showed an increase of more than 5·0 mm. Hg. The facility of outflow varied considerably but seemed to increase when the initial facility of outflow was low and vice versa. In the same way eyes with an initial high rate of flow responded with decrease in flow and vice versa.

2. The Priscoline test was done on 21 normal eyes. All

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37. Swanljung, H. and Blodi, F. C.: A. J. O.: Feb. 1956 : 41-2 : 187-97.

experienced an increase in intraocular pressure up to 9·0 mm. Hg. Facility of outflow and total rate of flow of aqueous behaved practically identical as in the water-drinking test.

3. The water-drinking test was done on 24 glaucomatous eyes. Six eyes did not respond with an increase in the intraocular pressure of 6·0 mm. Hg. or more. The facility of outflow changed very little. The rate of flow increased in all cases with a pathologic response of the intraocular pressure.

4. The Priscoline test was performed on 10 glaucomatous eyes, six of which experienced a rise in intraocular pressure of more than 10 mm. Hg. The facility of outflow did not change considerably. The rate of flow was markedly increased.

5. A dose of 500 mg. Diamox was given one hour before the water-drinking test in 12 patients with chronic wide-angle glaucoma. The rise in intraocular pressure was uniformly reduced. The facility of outflow showed inconsistent changes. The total rate of flow was decreased.

The water-drinking test should be the first provocative test in a suspicious case of chronic glaucoma. Its reliability was, in the authors' series, 70 per cent. If it is negative, the Priscoline test should be done. Its reliability was 60 per cent but it was positive in cases which did not respond to the water drinking test. Both tests are effective via an increased total flow of aqueous. The facility of outflow changes little in glaucomatous eyes. The increased total flow in the water-drinking test can be diminished by Diamox.

INJURIES AND BURNS

38. Eye Injuries Due to Fireworks.

The only records in the medical literature concerning eye injuries due to fireworks were published in the United States of America. Between 1937 and 1946 the six annual summaries of the Fourth of July injuries show a decreasing incidence of firework accidents involving the eye. In 1937 there were 16 patients who lost the vision of one or both the eyes and 294 who received eye injuries of a less serious nature; the figures for 1946 were 1 and 44 respectively in the two groups.

Large quantities of fireworks were ignited in London last year

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[38]. May, W. : B. M. J. : Nov. 1956 : 1040.

on November 5, which was a fine Saturday evening. and it is perhaps gratifying to note that only 14 eye injuries were serious enough to require in-patient hospital treatment. Eleven patients (78·5 %) were boys aged 3 to 14 years. Most injuries were of a minor character, and the problem does not seem to be serious enough to urge for the legislation about the sale of fireworks. However, four injuries were of a serious nature, one eye being lost. It is of special interest that the lost eye was due to a falling rocket stick, and another severe injury was thought to be due to a rocket. This might suggest that further efforts be made to ensure that all the falling parts of rockets disintegrate before reaching the ground.

On November 5, 1955, 14 eye injuries due to fireworks occurred in the London postal area, and required admission of the patients to hospital.

A review of the literature shows that no figures are available for previous years in England.

39. Eye Injuries in Children.

Since the introduction of the Davy Crockett programmes a significant increase in the number of children admitted to this hospital with eye injuries from bow and arrows and air-gun pellets. In many cases the injured eye has lost all useful vision. The authors feel it their duty to draw attention to the facts in the hope that some effective action may be taken.

LACHRYMAL APPARATUS

40. Dacrocystography.

Routine use of radiography of the lacrimal passages is recommended in all cases of epiphora.

It was shown previously that, although the nasolacrimal system may be patent by the ordinary irrigation, impaired drainage function can be demonstrated by the dacryocystogram. This type of "functional block" may be an indication for dacryocystorhinostomy.

When patency of the lacrimal passages cannot be demonstrated by routine irrigation, the preoperative use of dacryocystography is indicated to show (a) the character of the structures

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[39]. Cameron, A. J., et. al. : B. M. J. : May 12, 1956 : 1105.

[40]. Demorest, B. H. and Milder B.; Arch Ophth. : Sept. 1955 : 54-3 : 410-21.

adjacent to the sac, (b) the position and extent of the stenosis, and (c) the size and tonus of the sac.

Illustrative cases are presented to show some of the interesting types of a pathology which may be demonstrated radiographically.

Following operative procedures, the dacryocystogram is useful in evaluating the results of the surgery.

LENS AND CATARACT

41. Alloxan Diabetes Cataract.

An ophthalmoscopic and histologic study of cataracts caused by alloxan diabetes in the rat and rabbit was made. The formation and progression of diabetic cataract are observed in relation to the severity of the diabetes. The addition of nicotinic acid, the injection of cysteine, and the maintenance of rats in an atmosphere of 38% - 40% oxygen were not found to alter the progression of a cataract in alloxan-diabetic rats.

42. Bilateral dislocation of Lens.

(1) A case of Marfan's syndrome with ocular abnormalities and cardiovascular disorder is described in which the patient had voluntary postural control over the dislocated lenses.

(2) Absence of miosis, dilatation of the pupil by atropine, and absence of rise of tension in the eyes were other noteworthy features.

43. Iodoacetic Acid Cataract.

The clinical and histological features of cataract produced in three adult New Zealand white rabbits by repeated intravenous injections of iodoacetic acid (20 mg./kg. body weight) are described.

The cataracts developed in the posterior cortex and were accompanied by vacuole formation, granular white and polychromatic opacifications, and anomalous suture-like clefts.

The histological changes of iodoacetic acid cararacts have been studied in seven rabbits. They consisted of (1) lens fiber

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[41]. Bounds, G. W., et. al. : Arch. Ophth : Oct. 1955 : 54-4 : 564-72.

[42]. Das-Gupta, B. K., and Basu, R. K. : B. J. O. : Sept. 1955. : 39-9 : 566-68.

[43]. Cibis, P. A. and Noell W. K. : A. J. O. : Sept. 1955. : 40-3 : 379-82.

swelling, (2) disorganization and failure of the cells at the equator to differentiate into normal lens fibers, (3) migration of aberrant cells beneath the posterior capsule and formation of bladder cells, and (4) development of globular and amorphous masses in the posterior cortex.

Within certain limitations, the iodoacetic acid cataract resembles clinically and histologically the radiation cataract.

44. Lens Extraction in Glaucoma.

The indications for lens extraction in glaucoma are reviewed.

Extraction appears indicated in intumescence, phacolytic glaucoma, glaucoma secondary to a dislocated lens, and maligment glaucoma, but its value is doutbful in glaucoma capsulare.

In addition, lens extraction is suggested in advanced cases of acute iris-block glaucoma with a very shallow anterior chamber and a high tension which does not respond to medication, or in cases in which the patient has been in the acute attack for three days or more. This suggestion is made even when the lens is clear, but especially when the lens is already moderately to densely opaque or when the other eye is already aphakic.

45. Metabolism of Crystalline Lens

1. The lens grows rapidly in the early foetal life and at a relatively constant rate in the adult life.

2. The lens consumes oxygen slightly but clearly. The oxygen uptake in vitro is operated by both enzymatic and non-enzymatic processes.

3. The lens decomposes glucose to pyruvate.

4. The series substances of Emboden-Meyerhof Parnas's diagram are found in the rabbit and bovine lenses. The process of glueose catabolism is analogous to that of muscle.

5. Pyruvate is reduced to lactic acid mainly in the lens cortex while it is oxidised aerobically in the lens epithelium.

6. Pyruvic acid, alpha-ketoglutaric acid and oxalo acetic acid are found in the lens, and these substances are oxidised by the lens extract.

From these facts, TCA cycle may be operated in the lens.

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[44]. Tamler, E., and Maumenee A. E. : Arch. Ophth. : Dec. 1955 : 54-6 : 816-30.

[45]. Uyama Y. and Ogini S. : M. J. O. U. : March 1956 : 6-4 : 813-52.

7. Cytochrome series, riboflavine and cocarboxylase are found in the lens epithelium. Nadi's reaction is positive only in the lens epithelium.

8. Organic phosphate, inorganic phosphate and energy rich phosphate compounds are found in the rabbit and bovine lenses. Adenosine triphosphate is especially rich in the equatorial part of the lens and creatine phosphate is rich in the posterior cortex.

9. In the normal lens, ascorbic acid is synthesized from mannose and glucose but not from frutose, galactose and ribose. These processes are specific to the lens in ocular tissues. This process is dominant in the rabbit and bovine lens but it is not clear in the guinea pig lens.

10. The phosphate is essential for the synthesis of ascorbic acid.

11. The following biochemical pathway from mannose to ascorbic acid was determined; mannose→mannonic acid→diketogulonic acid→dehydroascorbic acid⇄ascorbic acid.

12. 2—Keto—1—gulonic acid and 5—ketogulonic acid are converted to ascorbic acid by the lens extract.

13. In the cataractous lens, ascorbic acid is oxidised to oxalic acid via dehydroascorbic acid and diketogulonic acid.

14. Vitamin C formation in the lens is activated by bubbling air or by adding glutathione.

15. Folic acid may participate in the Vitamin C formation by lens extract.

16. Mn ions activate the formation of ascorbic acid in the lens.

17. The synthesis of ascorbic acid in the hatching eggs increases by injecting mannose and glucose.

18. Ascorbic acid synthesized in the lens may be never negligible as the origin of vitamin C in the aqueous humour.

19. Eight to nine per cent of glutathione in the lens is reduced form.

20. Oxidised glutathione is converted to reduced form by normal lens extract. The reductase activity decreases by dialysis, but is is activated again by adding triphosphopyridine nuclectide.

21. In the cataractous lens, this reductase activity decreases markedly. The enzyme activity in the cataractous lens is activated again by TPN in the early stage.

22. The cataractogenic agent in [naphthalene cataract is beta naphthoquenone. This quinoide substance is excreted as mercapturic acid.

23. The guinea pigs fed on a vitamin C deficient diet developed cataracts by injecting benzoquinoneacetic acid.

24. When butyric acid and tyrosine are simultaneously injected in the guinea pig maintained on a vitamin C deficient diet, benzoquinoneacetic acid is excreted in the urine and cataract appears in the eye lens.

25. The guinea pig develops cataracts of the eye lenses following injection of dopa-quinone.

26. The chickens develop cataracts by injecting adrenaline quinone.

27. These cataracts due to various quinoide substances are prevented by vitamin C and 5-hydroxyanthranilic acid.

28. A high casein diet causes an earlier induction of galactose cataracts.

29. The guinea pigs fed on a vitamin C deficient diet and administered galactose and tyrosine at the same time, develop cataracts and benzoquinoneacetic acid is demonstrated in urine of the animals.

30. A high casein diet causes an earlier induction of cataracts in the alloxan diabetic rats.

31. Benzoquinoneacetic acid is excreted in urine of the alloxan diabetic rats administered tyrosine and cataract appears in the eye lens.

32. Para-aminophenol and para-nitrophenol compounds are essential for the occurrence of cataracts of the guinea pigs fed on a vitamin C deficient diet.

33. Amidol (2-amino-4-aminophenol) is excreted in urine of rabbit administered dinitrophenol. The guinea pigs fed on a vitamin C deficient diet develop cataracts of the eye lenses by injecting oxidised substance of amidol.

34. Vitamin C deficiency is found in the senile cataractous patients.

35. 5-oxyanthranilic acid. one of the intermediates of tryptophan metabolism is eliminated in urine of the senile cataractous patients.

The guinea pigs fed on a vitamin C deficient diet develop cataracts of the lenses by injecting quinoneimine-caboxylic acid prepared from 5-oxyanthranilic acid.

36. Glutathione is synthesized from glutamic acid, cysteine and glycine in the rabbit lens.

37. Glycine is incorporated to serine in the lens.

38. Glutamic acid-alanine and glutamic acid-aspartic acid transaminase systems are operated in the lens.

39. A considerable phosphatase, adenosine triphosphatase and 1-peptidase activities are found in the lens. Ascorbic acid and glutathione inhibit these enzyme activities.

40. Beta-crystalline acts as a protective colloid for alpha-crystalline of the lens protein.

41. Crysteine in the lens protein is oxidised to cystine in the cataract formation. The soluble protein of lens decreases and on the contrary insoluble protein increases with development of cataract.

42. The energy metabolism is essential for the normal maintenance of water and potassium in the lens.

46. Spontaneous Absorption of a Cataractous Lens.

A case is reported of special interest because it presents an example of complete absorption of both a cataractous lens and and its anterior capsule 29 years after development of a toxic cataract. It is also of interest that the patient was able to regain 20/20 corrected vision in spite of an amblyopia of such duration.

LIDS

47 Correction of Blepharophimosis.

(*a*) Blepharophimosis has a historical aspect which is quite interesting.

(*b*) The surgery as it has been carried out in the past has gone through two rather interesting phases. An attempt has been made to trace this. Tissue reactions cannot correct the basic pathology. They may eliminate the epicanthal fold, but when that is done the palpebral fissure is elongated only by dragging the inner canthal angle towards the midline, thereby increasing the ptosis and failing to correct the dissimilarity in the palpebral fissures. The plastic rearrangement of tissues as they lie in the epicanthal folds is the proper method for correction.

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46. Corin N. : Arch. Ophth. : Jan. 1956: 55-1 : 118.

47. Spaeth, E. B. : A. J. O. : Jan. 1956: 41-1 : 61-71.

(*c*) The ptosis, which is related to the symptom complex, needs special attention, but this is not tremendously difficult, nor is it involved.

(*d*) The condition is an ophthalmologic one, should be corrected by an ophthalmologist, and should consider four aspects : (1) the correction of the ptosis, (2) the elongation of the palpebral fissure, (3) a correction or adujstmet of the dissimilarity in the length of the lid margins, and (4) the elimination of the epicanthus. All this, apparently can be done satisfactorily at the medical canthal angle.

MALIGNANCY, TUMORS Etc.

48. Epithelial Tumors of the Eyelids.

(1) A series of 82 tumors of the eyelids were classified by histologic types, degree of involvement, type of treatment, and prognosis.

2. It is suggested that the terms "mixed" epitheliomas, "mixed baso-squamous epitheliomas" and "adenocystic" tumors be used rarely for eyelid epitheliomas and then only with clear definitions. These terms are confusing and each has been applied to several recognizable histologic entities. For clearer clinical connotation it is suggested that a "mixed" baso-squamous cell epithelioma should be classified as either basal—or squamous—cell carcinoma depending upon the most significant histologic pattern and probable clinical course. Further, it is suggested that the term "adenocystic" be avoided because of lack of present acceptance of its use for any single histologic entity.

MISCELLANEOUS

49. Blindness.

The bleak if familiar forecast of an ageing population, increasing by blind, deaf, halt, and impotent, is underlined by the further Ministry of Health report on blindness of England that professor Arnold Sorby has just prepared. This is a carefully documented analysis of the figures of blind registration in England during the period 1951-4, along the lines of his previous study for the years 1948-50, and it follows the evolutionary

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[48] Smith A. G., and Brockman J. L. : A. J. O. : Oct. 1955 : 40-4 : 522-28.

[49] B. M. J. : July 21, 1956 : 146.

history of the various blinding diseases one further stage down their gloomy course.

As might be expected from an affection of which all the major causes are part of the degenerative changes of old age-cataract 26·2%, senile macular lesions 21·6%, and glaucoma 13·6%-the figures show a disproportionate increase of blindness in the whole population from 86,389 on 31, March, 1952 to December 31, 1954, but practically the whole of this is confined to the group over 70 years of age. Women greatly outnumber men among the aged blind. The largest single cause of blindness is still senile cataract, and this is par excellence a remediable condition; yet of those so registered 82% have received no treatment, though some 50% are considered to be amenable to surgical relief. Many factors probably contribute to this astonishing finding—the patient who seeks no advice because of ignorance, timidity, folly, or passivity; the unqualified practitioner who treats failing sight with repeated changes of glasses without referring the patient to an ophthalmic surgeon, and finally, the oculist who for personal reasons always hesitates to operate. At least we can be encouraged that this admirably clear report must lead, however indirectly, to the enlightenment of patient, optician and oculist, so that this vast assembly of the remediable blind should surely decrease as the years pass.

In the younger adult age-group (21 to 59) there has been an encouraging decrease in those registered as blind, possibly attributable to the improved methods and coverage of ophthalmic treatment. The reduced incidence of sympathetic ophthalmitis is particularly noteworthy, perhaps a result of cortisone treatment.

A striking increase in blindness has been noted in the very young, primarily due to the spate of retrolental fibroplasia, which was responsible for over a half of those registered as blind when less than a year old and a quarter of those aged between 1 to 4. These blinded infants are expected to swell the population of blind schools from 1,400 to 2,200 in 1958-9. The report discusses retrolental fibroplasia with rather more concern than seems justified, for it does not mention how dramatically the situation has changed. Since oxygen administration to premature babies has been curtailed (with a maximum concentration of 45%)

no further cases have been reported. A year ago a report came from the Medical Research Council which, after summarizing the work of N. H. Ashton and his associates at the Institute of Ophthalmology, concluded thus : "It seems clear that retrolental fibroplasia as a common and tragic disease has already virtually disappeared as dramatically as it appeared a little over a decade ago. Seldom has a disease, so apparently enigmatic in its causation, so intractable to treatment, and so tragic in its effects, been so rapidly brought under control."

50. Blindness following Hexamethonium

Hexamethonium is a quaternary ammonium compound in wide use to lower high blood pressure and to reduce bleeding in extensive surgical operations. Four minutes after a patient with essential hypertension was given hexamethonium chloride intramuscularly her vision began to fail, and in a few minutes thereafter she became totally and permanently blind.

This presentation is a factual one, without attempt at analysis or evaluation. The reported case proves very little one way or the other. It does, however, suggest that ophthalmologists may well hold the quaternary ammonium compounds in a somewhat skeptical regard until more is known about their ocular effects.

51. Expulsive Hemorrhage.

Histologic examination of 10 eyes in which an expulsive hemorrhage had occurred revealed that these hemorrhages originate from ruptured necrotic posterior ciliary arteries. An important factor in the pathogenesis of intraocular vascular degeneration is the circumstance that the extravascular pressure within the eye is about 20 to 22 mm. Hg. higher than the (atmospheric) extravascular pressure elsewhere in the body.

The nutrition of an arteriolar wall is accomplished by a diffuse penetration of fluid from inside and from outside the vessel. The fluid is ultimately discharged into the perivascular tissue.

This fluid circulation within the intraocular arteriolar walls can be hampered by three factors : (1) high blood pressure,

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[50]. Bruce G. M. : Arch. Ophth. : Sept. 1955 : 54-3 : 422-24.

[51]. Manschot W. A. : A. O. J. : July 1955 : 40-1 : 15-24.

causing arteriolar sclerosis; (2) general arteriosclerosis, both by means of the structural changes in the arteriolar wall, and by a reduced passage of blood through the vessel; and (3) the intraocular pressure.

An increased extravascular pressure hampers the outflow of the circulating intramural fluid and reduces the passage of blood through the vessel. In glaucoma the intraocular pressure can exceed the arteriolar blood pressure. In these cases the vessels remain closed, and an ischemic necrosis can occur, even in otherwise unimpaired vessels.

The necrosis of the posterior ciliary arteries in most cases of expulsive hemmorrhage may be induced by a combination of glaucoma and high blood pressure or general arteriosclerosis. This combination is, however, not imperative; every one of the three factors mentioned above can produce the vascular necrosis by itself.

52. Eye Bank Programme.

From the perspective of 10 years' experience with the eye-bank programme, certain conclusions are evident.

A coordinated national service offers several benefits. Available donor tissue is brought within reach of all qualified ophthalmologists. Financial support and the voluntary services of hospitals and transportation agencies can most effectively be enlisted through a single agency.

Any bank project, large or small, requires continuous professional supervision. Lay direction offers serious medical hazards.

The steady increase in the number of donated cadaver eyes has demonstrated that objective and realistic interpretation to the public can overcome prejudice against the removal of the eyes from the dead. On the other hand, sensational press stories, which occasionally appear, can prove damaging.

The eye-bank has stimulated the extension of keratoplasty in the United States, both in its primary role as a source of donor tissue and in its promotion of research and teaching.

53. Hereditary Eye Disease.

Classification of the important hereditary eye diseases :

[52]. Paton R. T. : A. J. O. : March 1955 : 41-3 : 419-24.

[53]. Manchester P. T. : A. J. O. : Sept. 1955 : 40-3 : 412-17.

Dominant.

Concomitant strabisums. Duane's syndrome. Ptosis with epicanthus. Phakomatoses. Blue sclerotic syndrome. Cataracts (congenital and postnatal). Retinoblastoma. Glaucoma. Dacryocystitis. Arachnodactyly. Corneal dystrophy of granular type and lattice type. Aniridia. Recurrent corneal erosion. Heterochromia congenita. Dominant optic atrophy of children.

Recessive.

Pure albinism. Microphakia. Amaurotic family idiocy. Laurence Moon Biedl syndrome. Hydrophthalmos. Corneal dystrophy-macular type.

Sex-Linked.

Choroideremia. Red-green color-blindness. Megalocornea. Lebers' hereditary optic atrophy.

Diseases with unpredictable modes of inheritance.

Cerebromacular degeneration. Macular dystrophy. Congenital absence of rods. Congenital absence of cones. Keratoconus--usually alternating with high astigmatism.

Craniofacial anomalies. Hereditary Hataxias. Elastosis dystrophica--Groenblad--Strandberg syndrome—pseudoxanthoma elasticum. Nystagmus. Pigmentary degeneration of retina. Progressive external ophthalmoplegia. Gyrate atrophy. Fuch's epithelial-endothelial dystrophy.

54. Hysterical Amblyopia.

The tubular fields of hysteria are easily diagnosed from the following criteria :

(a) The fields are of the same size no matter what the distance.

(b) The borders are very sharp.

(c) The field is circular.

The confrontation method is a quick and reliable screening technique.

The method of taking the visual field appears to play no role in the incidence of tubular fields.

Tubular fields are not rare. The incidence in this study was 5·25% of eye patients.

Tubular fields are common in patients with organic eye disease.

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54. Schlaegei T. F. and Quilala, F. V. : Arch. Ophth. : Dec. 1955 : 54-6 : 875-84.

Corneal sensitivity is reduced in tubular field patients but is not a reliable diagnostic sign.

The tubular fields observed in this study varied from 2 to 25 degrees but were most commonly 10 degrees in radius when measured at 1 meter.

Contrary to popular belief, the tubular fields in our series were commonest between the ages of 50 to 64.

Reduced visual acuity was the commonest presenting complaint, but some had no eye complaint.

Although amblyopia is commonly associated with tubular fields, the visual acuity as a result of refraction was 20/20 or better in 48% of the authors' cases. The vision is frequently easily improved by such suggestion and encouragement.

55. Intracranial Calcium Deposits.

Calcium deposits in the cornea, in the form of a band-shaped keratopathy, may be occasionally seen on routine X-ray examination of the skull. While most forms of cataract show no evidence of calcium deposits on routine skull X-ray, a calcified lens can produce a characteristic, unmistakable shadow.

In a large proportion of cases of retinoblastoma small islets of calcium are present in the tumor, and it is estimated that in 75% of cases these deposits may be seen radio-graphically. Although calcification may occur in conditions listed as pseudogelioma such as retrolental fibroplasia, and in inflammatory conditions producing organized inflammatory tissue in the vitreous, such as tuberculoma, gumma, exudative retinitis of Coats, metastatic Ophthalmitis, detached retina, angiomata, and cysticercosis, it is rare for calcareous degeneration to be present in the eye of a child in circumstances other than a retinoblastoma.

Calcium deposits may be present in a retinoblastoma that has extended into the orbit. Calcium may be deposited in a glioma of the intraorbital portion of the optic nerve. Hemangioma or varix of the orbit may occasionally become calcified.

Intracanalicular deposits of calcium may follow fracture of the optic canal in which callus formation has taken place in the repair of the fracture, and in a calcified glioma of the optic chiasm that has extended into the optic canal.

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55. Alfano J. E. and White H. : Arch. Ophth. : July 1955 : 54-1 : 77-91.

Radiologic examination of the skull for evidence of intracranial calcifications may serve as a valuable diagnostic aid.

Calcifications may be seen normally in the pineal gland and choroid plexus of the lateral ventricles and as osseous plaques in the falx cerebri. Less commonly, calcifications may occur normally in the Pacchionian granulations and in the hypophysis.

The conditions of prime ophthalmologic importance in which intracranial calcifications may be seen include toxoplasmosis, Sturge-Weber syndrome, tuberous sclerosis, intracranial arterial aneurysms, cranio-pharyngioma, pituitary adenoma, slow-growing gliomas and meningiomas, hypoparathyroidism, subdural hematoma, cerebral arteriovenous malformations, and parasitic conditions.

Intracranial calcifications may also be seen in such conditions as encephalitis, lead intoxication, extreme old age, amaurotic idiocy, epilepsy, and old intracranial abscesses, tuberculomas, and hematomas.

56. Headache in School-children.

Headache and eye pain related to tenderness of the first C. T. P. (Cervical transverse process) tip are not uncommon in school-children and may occur as early as 5 years of age. It is often thought by parents to be connected with the eyes and leads to the unnecessary wearing of spectacles in some children. It may persist for years, and gives rise to the excessive taking of aspirin.

In a few children it cleared up spontaneously, while in the majority it responded rapidly to simple explanation and relaxation exercises. It is notable that most cases had tender areas in the neck muscles which, together with the tenderness of the first C. T. P. tip, disappeared after this simple treatment.

The region of the basiocciput seems to have received little investigation. Palpation of it, and of the adjoining neck muscles and cervical spine, does not usually form part of a routine examination. The authors think the region merits systematic examination so as to know more of its contribution to and connexion with the genesis of headache in childhood.

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56. Hughes E. L. and Cooper C. E. : B. M. J. : May 19, 1956 : 1141.

57. Visual Defects in Children.

(1) The majority of new cases of visual defect, mostly cases of astigmatism, are observed at the age of 8 - 9 years.

(2) There is a lag in the discovery and treatment of cases of defective vision after the children have started attending school; the effects of this lag are unknown--at worst it might be a factor in the proportion of illiterates who leave school, and at best it is not to be condoned in a comprehensive health service. The teacher-hours wasted in trying to educate children of 7 or 8 years of age with only 6/18 pt. or 6/12 pt. vision may be not inconsiderable with the substantial numbers involved.

(3) The young child with substandard vision rarely shows obvious symptoms unless the defect is gross, and it is difficult to distinguish backward from visually defective children.

(4) This problem could be resolved in one of two ways:

(a) A refraction of every child early in the school year;

(b) A reliable visual test very early in the school career.

The former may be ideal but presents a formidable task. Martin (1948) advocated three refractions for every school child, the first at 7 years old, but she did not consider this practicable at present.

The large-scale use of the illiterate E test should enable reliable vision tests to be done in the 6th year. A short series of games or exercises in the classroom with the E would both reduce the time taken for a vision test and greatly increase its efficiency.

It is significant that the attitude of the Chief Medical Officer of the Ministry of Education has changed in the last few years. In 1946 and 1947 the discovery of cases of visual disability in younger children was normally to be left to the teacher or parent, but the report for 1952 and 1953 expresses concern at the delay in discovering such cases. Purvis reported an experimental scheme in which a test was carried out on each child in its first year at school using a quick method of retinoscopy: 3·5 per cent of those examined were found to have severe visual defects which had hitherto been unsuspected, and this did not include abnormalities such as squints which were already under treatment; in addi-

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[57]. Meneil N. L. : B. J. O. : Nov. 1955 : 39-11 : 688-701.

tion, another 5·5 per cent had defects for which spectacles were considered necessary.

Tyser and Letchworth described a pilot scheme on somewhat similar lines; 8 per cent of their cases showed defects, astigmatism being a major factor.

The visual defects found in the children of a town with a population of 75,000 are described, the cases being analysed by sex, age, and age at first reporting.

Squints and their characteristics are described, the refractive errors in the non-squinting cases are classified, and the cases showing varying degrees of amblyopia are tabulated.

A practical method of improving the school medical service by more timely observation of visual defects is suggested.

58. Visual Aids for the Partially Sighted.

Visual aids for the partially sighted are not in principle different from visual aids for the normal. They are of two types : (a) aids for distance vision; (b) aids for near vision.

For distance vision, telescopic visual aids (miniature Galilean telescopes) are the best feasible. Useful retinal magnification will usually not exceed ×2·0 or ×2·2. Their field is limited.

For near vision, three types of visual aids are usable : (1) hand magnifiers or loupes; (2) telescopic lenses with reading caps; and (3) strong reading glasses, so-called microscopic lenses. The advantages and disadvantages of all three types are discussed.

A loupe can be used both with and without presbyopic reading correction. In the first case, print and loupe have to be held at specified distances. In the latter case, it is most advantageous to keep the print in, or near, the anterior focus of the loupe.

The partially sighted need not be corrected for 20/20 distance visual acuity or 20/20 equivalent near vision. Proper reading lenses are to be planned in terms of the available residual vision and in terms of the size of print the partially sighted wants, or needs, or is able to read.

Several practical rules are given. They should help the practitioner in the choice of the most appropriate reading aid.

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[58] Linksz A. : A. J. O. : Jan. 1956 : 41-1 : 30-41.

NEUROLOGY

59. Bilateral Palsy of the Sixth Cranial Nerve.

A cyst of the septum pellucidum caused severe unilateral headache accompanied by lateral rectus palsy that shifted from the left side over to the right side. The symptoms were alleviated temporarily by angiography. The complete and dramatic recovery that followed pneumoencephalography was due presumably to rupture of the cyst by the procedure.

60. Ocular Nerve Palsy Associated with Severe Headache.

In 1955 Jackson described four cases of ocular nerve palsy associated with severe headache occuring in diabetic patients. He pointed out that such an association of pain and ocular nerve palsy in diabetics has been only rarely mentioned in the literature. The author recently saw two cases of this syndrome in diabetics and as an entirely similar case in a non-diabetic.

The first two of these cases support Jackson's observations that a syndrome of ocular nerve palsy associated with headache occurs in diabetics. The third case is clinically identical, except that the patient is not a diabetic.

This syndrome of ocular nerve palsy associated with headache, presumably due to involvement of branches of the fifth nerve, has been recognized for a long time, and has been attributed to orbital periostitis affecting the sphenoidal fissure. Brain (1947) has pointed out that the prognosis of this disorder is good and recovery takes place within a few months.

In Jackson's cases, and in those reported here and in the literature referred to, such spontaneous recovery within three months was invariable. In the cases reported recovery took place independently of treatment. This property of complete recovery within a relatively short space of time is the most noteworthy feature of this sydrome.

NYSTAGMUS

61. Nystagmus as a Physical Sign in Alcoholic Intoxication.

The ingestion of a known volume of alcohol in volunteer subjects has been studied. In all cases nystagmus was produced

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[59]. Love, J. G., and Hollenhorst, R. W. : Proc. Mayo Clin. : Jan. 25, 1956 : 31-2 : 43-46.

[60]. Waind A. P. B. : B. M. J. : April 21, 1956. : 901.

[61]. Howells D. E. : B. M. J. : June 16, 1956 : 1406.

after a variable period of time. On the appearance of this physical sign the reaction time to a light or sound stimulus was prolonged.

OPERATIONS

62. Cardiac Arrest during Strabismus Surgery.

Tension on the medial and/or lateral rectus oculi with mobilization of the muscle in the course of strabismus operations resulted consistently in arrhythmia. In a series of 17 cases there was one instance of ventricular fibrillation, while all others presented varying degrees of bradycardia, sometimes combined with extrasystoles. In one case cardiac arrest occurred with continued pull on the medial rectus.

It has been demonstrated that even slight stretching of the medial and/or lateral rectus oculi is attended by some degree of arrhythmia; thus special care is required in isolating and dissecting these muscles.

Hitherto unexplained accidents during strabismus operations might conceivably be due to myocardial crises from excessive tension on the medial and/or lateral rectus oculi. The response seems to be closely related to the oculocardiac reflex, and is probably traceable to stimulation of terminal branches of the trigeminal nerve, which in turn activate the vagus. During strabismus operations the response is exaggerated to a dangerous degree, owing to the physiologic vagotonia of children and adolescents, and the effect of anesthesia on the myocardium.

63. Digital Pressure in Cataract Surgery.

Clinical and experimental evidence is adduced to emphasize the great importance of the use of digital pressure as a safeguard against vitreous loss in cataract surgery.

The site of the safeguarding action of digital pressure is localized, and preliminary evidence is presented as to the mechanism of action.

The application of digital pressure to the eyeball after retrobulbar injection is followed by a profound ocular hypotony and lowering of intravitreal pressure. In the operating room during cataract surgery the intraocular pressure decreased, in the average case, to 2·3 mm. Schiøtz; in over half the cases the

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[62]. Sorenson E. J. : A. J. O. : May 1956 : 41-5 : 748-52.

[63]. Kirsch, R. E. and Steinman, W. : Arch. Ophth. : Nov. 1955 : 54-5 : 697-703.

tension was 0 mm. Schiφtz, and the average duration of intraocular pressure below 10 mm. Schiφtz was 14·3 minutes. Control experiments indicate that this degree and duration of hypotony are lacking in eyes not subjected to application of digital pressure.

On the basis of the evidence at hand, it is strongly recommended that the application of five minutes of digital pressure to the eyeball following retrobulbar injection be adopted as a routine and vital safeguard in cataract surgery.

64. Hypotony after Cataract Extraction.

Persistent hypotony after cataract extraction is invariably the result of diffuse or localized wound leakage. When the drainage is diffuse spontaneous cure usually takes place and therapy is needed only to prevent the development of damaging adhesions. However, when the drainage is localized and persistent, the fistula must be closed. The symptoms vary with the amount of drainage. In severe cases there is complete absence of the anterior chamber, extensive choroidal detachment, and a soft irritable eye; in mild cases the anterior chamber is present, choroidal detachment is rarely visible, ocular tension is often normal, and the irritative symptoms are slight. The subsequent courses of the two types are also very different. Persistent absence or extreme shallowness of the anterior chamber is followed by central corneal damage, extensive peripheral anterior synechiae, and secondary glaucoma. The sequelae of the second type are progressive opacification of the vitreous, increasing uveal reaction, macular oedema, epithelization of the anterior chamber, secondary glaucoma, and late infection.

65. Infections after Cataract Extraction.

The results of preoperative, local application of antibiotics are reported in 7,662 cases of cataract operations performed from 1945 to October, 1955. Six cases of endophthalmitis resulted, five due to Staphylococcus aureus and one due to Escherichia coli. This is a reduction in incidence of infection over the previous 10 years.

2. Postoperative infections were absent in a small series of 567 cases carrying Staphylococcus aureus sometimes in asso-

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[64] Dunnington J. H. : B. J. O. : Jan. 1956 : 40-1 : 30-35.

[65] Khorazo D. L. and Gutierrez E. : A. J. O. : June 1956 : 41-6 : 981-87.

ciation with E. coli or Proteus vulgaris, when the operation was deferred for supplementary local treatments with antibiotics.

3. The eyelids carried the greater number of Staphylococcus aureus.

4. The incidence of Staphylococcus aureus in ocular cultures obtained before the operations has risen since 1938 from 21 per cent to 42·5 per cent of patients cultured.

5. The number of strains of Staphylococcus aureus sensitive to penicillin has dropped from 86 per cent to 22 per cent in the last 10 years and sensitivity to terramycin, chloramphenicol, and streptomycin is declining, necessitating the employment of new antibiotic agents.

6. After local antibiotic treatment the potential pathogens return to the eye in 24 hours.

66. Monocular Cataracts—Management.

The old belief that a cataract should not be operated upon as long as vision in the opposite eye is good should be discarded.

Mature and hypermature cataracts are more difficult to remove in capsule than if removed earlier. They should be allowed to reach this stage only in poor operative risks.

Complications are prone to occur in hypermature cataracts. The commonest are exotropia and secondary glaucoma.

Intelligent persons in the active phase of life, who are operated upon before exotropia occurs, will accustom themselves readily to wearing a contact lens, will get sufficient fusion to give them binocular single vision, and will enjoy a full field of vision on the side of the eye operated on. Some will continue to wear the contact lens in both eyes after both cataracts are removed because of the restricted field of vision and the annular scotoma produced by regular cataract lenses.

Monocular aphakics who wear a contact lens are the most satisfied of all cataract patients.

67. Myanesin Elixir in Cataract Extraction.

In 350 cases of cataract admitted to the ophthalmic ward of the L. L. R. Hospital, Kanpur, 200 patients selected at random were given no muscle relaxant and served as controls, while My-

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66. Goar E. L. : Arch. Ophth. : July 1955 : 54-1 : 73-6.

67. Avasthy P. : B. J. O. : Oct. 1955 : 39-19 : 623-25.

anesin was given to the remaining 150. Most of these patients were of nervous temperament and uncooperative, or else uneducated, with language difficulty.

The drug was administered orally in 2 dr. doses one hour before operation. No special precautions were necessary before administering the drug. On the night before the day of operation as well as just before the actual operation, the blood pressure and intra-ocular pressure were recorded. The intracapsular method of extraction was employed in 130 cases and the extracapsular method in the remaining twenty.

Results : Our studies of the 200 control cases indicated that the operation caused no significant alteration in the intra-ocular and blood pressure, but a loss of vitreous of varying degrees was sustained by 9 per cent of patients.

In the group pretreated with Myanesin, on the other hand, 70 per cent showed no change in the intra-ocular tension, 20 per cent a fall of about 45 mm.

There was also no significant variation in pre and postoperative blood pressure levels in the Myanesin group, and no vitreous loss was sustained. In the group pretreated with Myanesin which underwent intracapsular extraction, two patients sustained loss of vitreous; one was highly myopic and the other coughed violently during the operation.

In all the patients who had pretreatment with Myanesin, the eyes were quiet, as the movement of the extra-ocular muscles was very much reduced and they were completely relaxed. As the reduction in the tension was not appreciable there was no difficulty in the delivery of the lens. It felt as if the vitreous "had gone to sleep."

There were no post-operative complications, no delay in the healing of wounds, and no effect on the ultimate vision.

68. Cyclodiathermy in Glaucoma.

Basically, it is the author's conclusion that cyclodiathermy has great potential value in congenital glaucoma, open-angle glaucoma, narrow-angle (iris-block) glaucoma to a lesser degree, glaucoma associated with congenital defects of the globe, and secondary glaucoma of all types. Also, it has special value in combi-

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[68]. Forbes S. B. : A. J. O. : Nov. 1955 : 40-5(I) : 650-66.

nation with operative procedures such as cataract extraction, much as a posterior sclerotomy or an iridectomy has; as a preliminary operation prior to a cataract extraction, it is likewise valuable, and in combination with iridectomy in the treatment of congestive glaucoma it gives one the advantage of performing the iridectomy on a soft globe. In 11 of 14 aphakic eyes the procedure has been successful in the author's hands, the intraocular pressure in the remaining three being normalized later by cyclodialysis.

It is noteworthy that in the past, operations for glaucoma were designed to eliminate the aqueous. Now, the newer methods in cyclodiathermy and cycloelectrolysis aim to decrease the production of aqueous. The newer technique in cyclodiathermy has brought improved results, and the simplicity of the operation is in its favor. The ideal surgical approach, as pointed out recently by Weekers, would be an operative procedure or combined procedures which would affect favorably the rate of aqueous production and also the facility of aqueous outflow. This paper is presented in the hope of stimulating the development of such a solution to the problem of glaucoma surgery.

A series of 80 cases is reported and analyzed in which cyclodiathermy was employed in the treatment of various types of glaucoma with gratifying results. Six cases in which this therapy was successfully employed and two in which it was a failure are described. The old and the new techniques are discussed, and the role of the procedure in glaucoma surgery is evaluated.

In evaluating the results of any surgical treatment of glaucoma, one must keep in mind the broad range of results which may be termed successful. In many instances patients seek treatment only after the glaucoma is far advanced and some are blind in one eye. Recently, Lloyd aptly observed : " If the tension can be controlled or an enucleation avoided, that is surely as satisfactory a result as reducing the tension, enlarging the field, and improving the vision in eyes with vision such as 20/30. The important consideration is that the standard for success in glaucoma is control of tension and retention of vision in some cases, but in others control of tension is just as much as a triumph, and in still other cases avoiding an enucleation, even with higher than normal tension, if the eye is not troublesome, is a greater accomplishment." Each individual case has its own yardstick of success.

69. Peripheral Iridectomy.

A modified technique for iridectomy in narrow-angle (angle-closure) glaucoma is presented which ensures retention of the chamber at operation and prevents later leakage from the wound. Such a technique possesses important advantages.

1. The angle remains open discouraging the formation of postoperative peripheral adhesions.
2. Postoperative irritability of the iris is minimized as shown by the normal mobility and reactivity of the pupil to light, thus further discouraging adhesions.
3. The postoperative use of mydriatics and miotics which encourage adhesions in the angle and/or in the pupil can be dispensed with.
4. The technique is remarkably atraumatic. The escape of aqueous and associated positional changes of intraocular parts are avoided.
5. Retention of the chamber encourages the specific action of iridectomy. This consists of by-passing the secluded pupil, collapsing the bombe' of the iris, widening the angle, exposing the trabecula to aqueous, and deepening the axial chamber.
6. When performed before peripheral adhesions have formed or the permeability of the trabecula has been impaired by temporary closure of the angle, it breaks the vicious circle and reverses the narrow-angle (iris-block or angle-closure) process. This applies to the acute attacks as well as to the subacute chronic congestive, and noncongestive or prodromal phases of narrow-angle (angle-closure) glaucoma.
7. Retention of the chamber, by preventing forward propulsion of the lens-iris diaphragm, may be hoped to discourage the development of a malignant course.

This technique improves the results of peripheral iridectomy in narrow-angle (angle-closure) glaucoma when performed before peripheral adhesions have formed. It permits early and prophylactic operation with safety. It does not disturb vision because the small incision produces no astigmatism. It reverses the morbid process, restores physiologic conditions, and assures a permanent clinical cure.

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[69]. Barkan O. : A. J. O. : June 1956 : 41-6 : 964-69.

70. Polyvinyl Sponge Implant.

The left eyes of 20 dogs were either partially or completely eviscerated. Polyvinyl sponge was then inserted into these eyes, and their behavior was observed over variable periods of time up to one year. In the majority of eyes the sponge was successfully retained. In such specimens the interspaces of the sponge became filled with a connective tissue that was continuous with the tissues comprising the wall of the eye. These eyes showed a remarkable tolerance toward this sponge, and in several cases the corneas became transparent over an observation period of one year.

In those eyes in which either the sponge was extruded or the tissues exhibited an unsatisfactory reaction to the retained sponge, hemorrhage or secondary infection seemed to be the complicating factor.

The possible usefulness of polyvinyl sponge as an implant material among eyes requiring evisceration in humans is discussed.

OPTICS AND REFRACTION

71. Multicurve Fluidless Corneal Contact Lens.

The literature is reviewed for the purpose of disclosing advances in the optical correction of keratoconus which paralle the development of contact lenses, because heretofore the reports on keratoconus have been submerged in the reports on contact lenses.

A new fluidless corneal lens is introduced having multiple inside curves designed for use in severe case of keratoconus in which the radius of curvature is greater than that found in single curve lenses.

The authors' study comprises 29 patients classified as having medium to severe keratoconus. The patients have corneal curvatures with radii greater than 7 75 mm., i. e. a cornea which is more acutely curved than normal; therefore, these patients could not be successfully fitted with the conventional fluidless contact lenses. Of these patients, 60% have been observed for more than 10 years and 80% wore fluid lenses prior to the fluidless contact lenses now being worn.

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[70] Donin J. F. et al. : Arch. Ophth. : Sept. 1955 : 54-3 : 373-80 .

[71] Zekman T. N. and Krimmer B. M. : Arch. Ophth. : Oct. 1955 : 54-4 : 481-88.

Results of this limited study are highly favorable toward recommendation of the new lens described. Patients experienced subjective improvement, and measureable evidence is provided in terms of (a) increased visual acuity, (b) lowered incidence of corneal hydrops, (c) flattening of the corneal curvature, and (d) increased wearing time.

The use of these new multicurve fluidless corneal lenses is discussed with reference to the controversy whether a contact lens should actually come in contact with the apex of a corneal cone. The result of the authors' study indicates that fluidless contact lenses should touch the corneal apex, and that fluid lenses are not indicated in the optical correction of keratoconus; indeed, they are contraindicated for patients with keratoconus because they may cause (a) progression of the cone, (b) increase in corneal vascularization, (c) increaseed irritability of the eyes, and (d) increased incidence of acute and chronic hydrops of the cornea with resultant corneal scarring.

It is proposed that the wearing of a multicurve fluidless corneal contact lens is actually a method of treatment for reduction in the curvature of the corneal apex of a patient with keratoconus.

72. Food Habits of Myopic Children.

It must not be concluded that myopia in children is associated dietetically exclusively with a different pattern of protein consumption, still less with a deficiency in the accepted sense of the word. There is evidence that other food factors are implicated, and in most individual cases the food pattern is in no way basically abnormal even though the myopia may be increasing rapidly.

Before coming to a conclusion on the exact significance of these findings, the unusual growth of myopes must be linked with more detailed dietary intakes. None the less, the positive finding in this investigation is that myopic children are more particular about their sources of first-class protein than other children. There is an indication that this may be connected with their myopia because girls are more prone to pick and choose than boys and because the more active the myopia the higher the rate of refusal per head.

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[72]. Gardiner P. A. : B. M. J. : Sept. 22, 1956 : 699-700.

The refusal rates of items of first-class protein are shown to be higher in myopic children than in other children.

It is debatable whether this is connected with their myopia.

73. Intraocular Astigmatism.

The data obtained by the use of an ophthalmometer during a routine refraction procedure may often be very helpful in the diagnosis and correction of obscure problems in ocular refraction. It is true that only about 15 per cent of all refraction cases offer any real problems, but the short time required for ophthalmometer determinations during the examination routine and the great value of the findings in this minority of cases justify, the use of the instrument in all refractive cases.

The actual information obtained by the procedure may be summarized as follows:

1. Actual radii of curvature of the anterior corneal surface and their approximate dioptric refraction equivalents.
2. Regularity or irregularity of the toric or spheric anterior corneal surface.

From the first of these can be determined, by subtracting the lesser dioptric value from the greater, the approximate amount of anterior corneal astigmatism. This, in turn, would have to be modified if any great amount of hyperopia or myopia is present and if it is to be correlated to a lens situated some distance in front of the eyes. The use of Table I permits this to be done without calculating each case individually. The values thus obtained may then be compared with the results of the other refraction procedures, all of which include the total astigmatic component of the refractive error, so that the intraocular astigmatism may be determined. When interpreted in terms of the intraocular astigmatism frequency curves, it is then possible to postulate whether or not the lenticular astigmatic component is permanent or if it is merely part of a ciliary muscle hypertonus which will disappear when the hypertonus is relieved.

In the majority of refraction cases, the use of the retinoscope and the subjective method suffice to provide the patient with an acceptable lens correction. However, the added assurance of accuracy in prescribing lenses which is provided by those cases

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[73]. Tait E. F. : A. J. O. : May 1956 : 41-5 : 813-25.

in which the ophthalmometer corroborates the findings by other methods is well worth the slight extra effort expended in using the instrument.

TABLE 1.

Values (in diopters) of Concave cylindric lenses which, when situated at a Vertex distance of 1.2 cm. and combined with various Convex and Concave Spheres, will provide an effective lens power at the Cornea equal to the Keratometer findings.

	Anterior Corneal Astigmatism.					
Sphere	1.00	2.00	3.00	4.00	5.00	6.00
	Rx Cylinder (concave)					
+ 8.00	0.75	1.62	2.50	3.25	4.25	5.37
+ 6.00	0.87	1.62	2.62	3.50	4.67	5.67
+ 5.00	0.87	1.75	2.62	3.62	4.75	5.75
+ 4.00	0.87	1.87	2.75	3.87	4.87	5.87
+ 3.00	0.87	1.87	2.87	3.87	4.87	6.00
+ 2.00	1.00	2.00	3.00	4.00	5.00	6.12
+ 1.00	1.00	2.00	3.00	4.12	5.12	6.25
0.00	1.00	2.00	3.12	4.12	5.25	6.50
– 1.00	1.00	2.12	3.25	4.25	5.25	6.62
– 2.00	1.12	2.25	3.37	4.37	5.37	6.62
– 3.00	1.12	2.25	3.37	4.50	5.62	6.87
– 4.00	1.12	2.37	3.50	4.62	5.75	7.00
– 5.00	1.25	3.37	3.50	4.75	5.87	7.25
– 6.00	1.25	2.37	3.50	4.75	6.00	7.37
– 8.00	1.62	2.37	3.75	5.00	6.25	7.50
– 10.00	2.62	2.62	3.87	5.12	6.37	8.00

The greatest value of opthalmometry, however, is undoubtedly in the case of those persons who present anterior corneal astigmatic values which do not at all agree with the total astigmatism found by other methods. A real discrepancy between these two is a danger signal, suggesting a compensatory process which may be related to a ciliary muscle hypertonus and so subject to considerable variation without warning. Oftimes, even the use of homatropine, cyclogyl, or similar cycloplegics will not relieve such a condition immediately, although most will relax over a period of time with continued treatment or with the relief of the ciliary muscle effort usually responsible. Such cases may therefore be expected to require a change in correction lenses in the near future and the patient may be so informed and directed to return within a few weeks or months for further examination.

While this type of accommodative abnormality is most likely to be in age groups in which a ciliary muscle hypertonus usually develops, that is the third decade of life and the immediate presbyopic period, it may develop at any time prior to the age of 50 years.

In many of these cases which present a discrepancy, the intraocular astigmatism may be fixed and permanent, but nothing is lost by expecting difficulties, even if none appear, and certainly it is much to the interest of the patient to be sure in the matter.

The value of the ophthalmometer in the refraction of children, of illiterates, and of the non-cooperative individual is self-evident In the case of children intraocular astigmatism is infrequent and the instrumental results are usually immediately applicable after the necessary effectivity calculations have been made. The value of the procedure in the refraction of children is incontestable.

Aphakia is another condition in which the ophthalmometer data are of especial value. Because of the absence of the crystalline lens, the eye becomes, for all practical purposes, a single refracting surface and the corneal astigmatism approximates, with due allowance for lens effectivity, the actual correcting cylindrical component of tthe correcting lens. Time and effort can be saved by the use of the instrument during the refraction procedure.

Occasionally a cataract operation produces some temporary or permanent irregular corneal astigmatism which makes good vision difficult with the best lens correction. The ophthalmometer will immediately reveal the irregularity and thus the reasons for the visual difficulty.

Another but little appreciated value of the ophthalmometer determinations is that they permit a differentiation in anisometropia cases between those which are caused by different anteroposterior lengths of the two eyes and those in which the refractive inequality is due to different corneal curvatures. This differentiation is quite important when considering the possibility of aniseikonia as a cause of continued difficulties with sensory fusion and binocular vision.

Careful refractionists encounter occasional cases in which normal or near normal vision cannot be obtained, even though there is no apparent structural abnormality in the media or fundus. While some of these may be due to lesions in the postbulbar afferent visual nervous system, many are due to anterior corneal irregularities, including early keratoconus, which cannot be recognized or definitely diagnosed with the ophthalmoscope, retinoscope, or with the slit-lamp. In such cases, the ophthalmometer immediately demonstrates the reason for the visual deficiency.

Ophthalmometer determinations are of outstanding value in many ocular refraction cases, but it is impossible to select in advance those of the whole group in which they will be of major importance, so that, the instrument should be used in every case especially in view of the little time required. Indeed the instrument may be used by the refractionist's office assistant if he does not desire to use it personally, and the test can be completed within one minute after a patient has been placed in the proper position. Difficulties in the application of the test results, which formerly discouraged the use of the instrument, can be largely overcome by an understanding and an application of the principles and methods developed in this paper.

74. Unequal Corrected Acuity in Anisometropia.

A sample of approximately 200 patients from private practice, selected as showing no apparent pathology, no opacities of the media (no person was over 55 years of age), and no strabismus, but all with anisometropia of at least 1·00 D. or astigmia of 100 D. in one eye, were studied statistically. Particular attention was given to the relation of corrected visual acuity to certain refractive differences between the eyes of the pair.

The following are the essential findings:

1. When the cases are sorted on the basis of equivalent spheres, there is a striking difference between myopia and hyperopia in the relation of the corrected acuities of an eye pair.

(*a*) Equal corrected acuity (iso-oxyopia) is significantly commoner in myopia than in hyperopia.

(*b*) Unequal corrected acuities (aniso-oxyopia) are both significantly commoner and reach higher values in hyperopia than in myopia.

(*c*) The corrected acuity of the "better" (less ametropic) eye decreases, although not strikingly, with increase in ametropia, the decrease being slightly more rapid in hyperopia than in myopia. The average does not fall below 20/20.

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[74]. Jampolsky A., et al. : Arch. Ophth. : Dec. 1955 : 54-6 : 893-905.

(*d*) The correct acuity of the "worse" eye in myopia falls with increase in ametropia slightly more rapidly than that of its better fellow.

(*e*) The corrected acuity of the "worse" eye in hyperopia falls with increase of ametropia significantly more rapidly than the acuity for its better fellow or the acuity for either the "better" or the "worse" eye in myopia.

(*f*) In consequence, the average corrected acuity of hyperopic eyes is lower than that of myopic eyes, as has been reported by a number of workers. It should be emphasized that low corrected acuity tends to be characteristic only of the "worse" eye of the hyperopic nonstrabismic pair.

(*g*) Although unequal corrected acuity is associated with anisometropia, its greater incidence in hyperopia is not due to a greater incidence of anisometropia in this sample, since the occurrence of anisometropia does not differ significantly between the myopic and the hyperopic groups.

2. When sorting is done on the basis of ametropia differences between meridians and astigma differences, the following results were apparent:

(*a*) In the hyperopic sample there was a marked and statistically significant tendency toward lower corrected acuity in the eye with any or all of the following :

(1) Greater astigmia.
(2) Greater ametropia in the vertical meridian.
(3) Greater ametropia in the horizontal meridian.

The strength of this association between corrected acuity differences and refractive differences is indexed by a multiple correlation coefficient of $R^2 = 0{\cdot}708$.

(*b*) In the myopic sample there was a much less marked tendency of the same kind. Of the three kinds of refractive differences considered, only differences in astigmia yielded a statistically significant regression coefficient. The value of R^2 was $0{\cdot}131$, which, though statistically significant, is not large enough to indicate a very strong relationship between acuity difference and refractive differences.

3. Since only the relations at the time of examination, and not their development, are shown by the data, no direct light is thrown on the etiology of unequal corrected acuity in nonstrabis-

mic patients. A longitudinal study of a large number of children from before the age of 6 to stable adult conditions is necessary to make clear the dynamics of unequal corrected acuity. Such a study is highly desirable.

(*a*) In the absence of any discontinuity in the distribution of acuities, or knowledge of the origin of the condition, or of its response to treatment the authors have avoided the implications of the term "amblyopia" and have used instead the non-committal word "aniso oxyopia" for the observed unequal corrected acuity

(*b*) There is evidence that if the eye is deprived of clea images in early stages of development at least before the ag of 6 years, acuity seldom reaches normal levels, constituting th so-called "amblyopia of arrest." This may well have been factor in the present cases, but unfortunately records are no complete enough either to prove or to disprove the point.

(*c*) It may be argued that if the anisometropia were no corrected early, the conditions would favor the differences observe between myopia and hyperopia. For if both eyes are myopic i different degrees, there exists for each eye a distance at whic clear image may be obtained without accommodation. On th other hand in hyperopia no object at any distance may be clearl imaged without accommodation. For both near and far object that amount of accommodation will probably be invoked whic will give a clear image in the less hyperopic eye, and its mor hyperopic fellow will never enjoy clear images.

(*d*) It is possible that the unequal corrected visual acuit observed had a mixed origin, involving other factors, such a suppression, aniseikonia, and optical effects. However,the hypo thesis of accommodative posture in anisometropia which ha not had early refractive correction is most appealing.

ORBIT

75. Application of Positive Pressure to the Orbit.

A vinyl plastic bag designed to be placed under a Wheel patch and connected to a manometer has been developed. Wi this apparatus the loosening which occurs during the life of a ocular bandage has been investigated. The bag has been us clinically to apply constant pressure to the orbit.

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75. McCulloch C. and Cowan R. F. : A. J. O. : Aug. 1955 : 40-2 193-98.

A Wheeler patch has certain characteristics. It relaxes for one to three hours after it is applied, it then remains at a more steady state until close to the end of its life, when it again loosens.

Constant pressure on the orbit from the bag was found valuable after enucleation, operations on the tear sacs, plastic operations on the orbit, Keratoplasty, and after loss of the anterior chamber following cataract extraction and following filtering operations.

ORTHOPTICS

76. Strabismus

It is probably not safe to imagine new trends from the literature of one year. However, the striking increase in both the quantity and the quality of the articles from Central Europe (Switzerland, Austria, Germany, and Belgium) shows that an important change has taken place in the last few years. Apparently, the English deserve most of the credit, because Lyle is frequently cited and there have been prolonged visits by English orthoptists. We have already seen some of their papers on amblyopia and anomalous correspondence, and there are several more on orthoptics. They are characteristically long and detailed, in many instances, and most of them are enthusiastic, reporting far better results than we have learned to expect. Let us hope that this is not just enthusiasm for a new method. Some of their ideas are of considerable interest. Unfortunately, in almost no instance is sufficient detail given for an evaluation of the reported results.

In a long article on the bloodless treatment, Hamburger develops the theory that normal binocular vision falls between two extremes. At one end, there is strong monocular dominance, and at the other, horror fusionis with rapid competition. Most normals show a competition between the two retinas. Induced dominance exists to some extent in all normals, indicating that monocular dominance by no means stands for full predominance of one retina. Strabismus can be divided into two general groups on this basis : (1) monocular with amblyopia, a variation of monocular dominance, and (2) alternating strabismus with anomalous corrrespondence, a variation of rapid competition. He believes

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76. Wheeler M. C. : Arch. Ophth. : July 1955 : 54-1 : 100-34.

ROJA MUTHIAH
47, HOSPITAL STREET

that accommodation, temporary pareses, or influences of central nervous character bring about strabismus and the sensory conditions are an adaptation. The essential steps in his treatment are as follows : 1. Corrective glasses. He insists on full correction, including the astigmatism. 2. Elimination of amblyopia. This can be done without occlusion only in school; it must be continued to the 14th year. 3. Rehabilitation or reawakening of normal binocular vision. (a) Monocular strabismus: Binocular vision with all degrees of fusion comes spontaneously if vision is rendered close to equal and axes are made parallel by glasses or operation. (*b*) Alternating strabismus : a perfect type of vision, in many respects superior to normal binocular vision. He advocates early operation (after 5 years of age) and prolonged orthoptic training. On the assumption that horror fusionis is the leading motive for anomalous correspondence, the squinting fovea must be made amblyopic by prolonged occlusion, both before and after operation, to enforce dominance of the other eye. He bandages the squinting eye for 4 to 8 weeks after operation, in addition to orthoptics, for which he favours Lyle's method of kinetic stimulation, for 6 to 12 months. In spite of this unusual approach, he concludes that a true and full normalization of the binocular act of vision is rare even with the most careful orthoptic treatment, and in most cases we have to be satisfied if the eyes are parallel.

Evans bases his binocular examination and orthoptic treatment on the Stereo-Orthoptor. He treats all cases of strabismus up to 20 degrees orthoptically. For the larger deviations, especially those with anomalous correspondence, an operation is usually necessary. He divides his cases into four groups, as follows :— 1. Amblyopia with normal correspondence, 27%. All but three patients were completely cured by orthoptics. Amblyopia often continued to improve after fusion was established and the eyes were straight. The average age at the first visit was 6·3 years. Amblyopia is curable at any age if there is normal correspondence. He found that fusion can be built up after the 10th or 15th year. 2. Pseudomacular or paramacular fixation. 3. Suppression scotoma with normal correspondence. This must be removed by training, then treated like the first type. He was able to overcome horror fusionis in some cases. Secondary deviations have been reduced considerably by postoperative orthoptics. Hypercorrections and hypocorrections can almost always be levelled off by orthoptics started a few days after operation. Functional and cosmetic recoveries are expected in cases with norrmal correspondence treated by combined surgery and orthoptics, regardless of age. 4. Suppression scotoma with anomalous correspondence. He found third-degree fusion in eight cases. He always attempts to develop normal correspondence by intensive training. If this is unsuccessful there are two possibilities: 1. Anomalous correspondence is accepted and fusion built at the subjective angle; by orthoptics the objective angle is reduced until it corresponds to the angle of anomaly; unharmonious anomalous correspondence is transformed to harmonious; thus the deviation is somewhat diminished and the patient is given binocular vision despite the anomalous correspondence. 2. Strabismus operation : It is impossible to predict how the angle of anomaly will act. The angle of anomaly may remain constant, causing paradoxical diplopia. This is avoided by suppression or renewed deviation tending to approach the angle of anomaly or by a secondary deviation. There may be covariation of the angle of anomaly due to the altered objective angle, in which case the correction from operation will rarely be lasting. A third possibility is that normal correspondence may start again. Harmonious anomalous correspondence may contradict operation because it may exchange undesirable diplopia for form of binocular single vision.

77. Muscle Surgery and Orthoptics.

In comitant convergent strabismus before the age of six years, surgery gets good functional results. After the age of six years, functional cures following surgery are attained in most cases only with the aid of orthoptic training and, the older the patient the less chance of success whether orthoptic training is utilized or not.

Comitant divergent strabismus may be cured functionally at any age, and there seems to be no reason for urging early operation on the grounds of function alone. Other factors, such as psychologic trauma, increase in exotropia with time owing to an increasingly divergent position of the orbits and a lessening of accommodational tone, may justify early surgery in those cases which do not respond to orthoptics. Surgery should be done as soon as it is apparent that the exotropia is becoming constant.

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77. Cooper E. L. : A. J. O. : Dec. 1955 : 40-6 : 883-90.

When surgery is performed, the goal should always be proper alignment of the visual axes without incomitance and without impairment of convergence ability. For this reason, surgery is best done symmetrically, and great care should be exercised in recessing the medial recti in the face of a poor convergence near point.

In order to bring the eyes into alignment the amount of surgery to be done should be planned carefully, and careful consideration given in advance to the age of the patient, the age of onset, and the mount, variability, and intermittency of the squint measurements.

In last analysis, success in the treatment of nonaccommodative comitant strabismus depends on adequate and complete co-operation between the ophthalmologist and the orthoptic technician, the former correcting the deviation and the latter providing the necessary sensory background on which fusion may be built.

Given an otherwise healthy, intelligent, and co-operative patient, failure to cure a squint satisfactorily is due either to the surgeon's failure to abolish surgically the deviation, horizontal or vertical, or to the failure of orthoptics to help the patient to overcome anomalous correspondence and amblyopia. In this, as in any task worth doing, there is no substitute for experience.

RETINA, OPTIC NERVE, FUNDUS etc.,

78. Calibre Changes in Retinal Vessels.

(1) A photographic study has been made of the calibre changes in the retinal vessels occurring in chronic glaucoma simplex.

(2) A comparison was made by photographing the retinal vessels when the tension was high and again after the tension had been lowered by miotics or operation in a series of cases with differing degrees of raised tension. All cases had moderate or good retinal function.

(3) The changes were most marked in cases with the highest initial tension. These eyes were found to have a dilatation of both arteries and veins when the tension was raised.

(4) The dilatation is thought to be a local compensatory mechanism whereby the blood flow through the organ is improved

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78. Dobree J. H. : B. J. O. : Jan. 1956 : 40-1 : 1-13.

by lowering the vascular resistance. It is most likely to come into play in the higher degrees of raised ocular tension.

(5) Calibre variations of a less degree were found in the test cases with lower tension and in the controls. These are thought to have a physiological basis.

79. Chorioretinitis Produced by Atomic Bomb Explosion.

The energy released from an atomic bomb blast has visible infra-red and long ultra-violet rays, which are capable of producing thermal burns involving the choroid and retina. The pupillary diameter at the time of detonation is a very important factor. The pupillary and blink reflexes are too slow to prevent burning of the retina because sufficient energy for this arrives after the first 0·1 second. These reflexes take a longer time. The distance at which burns may be produced is much greater than that at which any other harmful effects of the atomic bomb occur. and at a given distance the burns on the retina are severer than those of the skin. This is true because of the optical system of the eye. It seems apperent that in a case reported the right eye did not receive the rays because of the shielding effect of the bony structures of the nose. It is concluded that the necessity of covering the eyes during an atomic blast is of the utmost importance.

80. Fat Embolism of the Retina

There appears to be no question that fat embolism of the eye, just as of other tissues, may follow extensive trauma in which long bones are fractured. There does seem to be a question as to whether the retinopathy of ocular fat embolism and Purtscher's traumatic retinal angiopathy are the same.

A case of systemic fat embolism due to trauma is presented in which a retinopathy similar to Purtscher's traumatic retinal angiopathy appeared. The retinopathy was thought clinically to be the result of ocular fat embolism, and, at necropsy, fat embolism of the retina was demonstrated by a technique oı a flat retinal preparation.

81. Fundus Oculi in Monozygotic Twins.

The fundus oculi has been studied in six pairs of monozygotic twins. The findings of earlier observers, to the effect that the

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[79]. Landsberg J. : Arch. Ophth. : Oct. 1955 : 54-4 : 539-40.

[80]. Kearns T. P. : A. J. O. : Jan. 1956 : 41-1 : 1-2.

[81]. Tower P. : Arch. Ophth. : Aug. 1955 : 54-2 : 225-39.

region of the papilla shows a high degree of correspondence, while the course of the retinal vessels presents few similarities, have been confirmed. However, it has also been established that the macular, as well as the perimacular region, exhibits a fair degree of correlation. On this basis it is concluded that the correspondence of retinal vessels in monozygotic twins varies in different parts of the vascular tree. While at or close to the papilla, and also in the macular and peri-macular regions, there is extensive concordance, dissimilarity prevails in the other portions of the retinal vessels. This latter finding is explained on an embryologic basis and traced to influences during the critical period of development.

82. Fundus Changes in Arterial Hypertension.

Changes in the fundus of the eye in hypertension present two distinct pictures : one is the result of exaggerated aging of the retinal arteries, of arteriosclerosis and of arteriolo-sclerosis, in which there is no abnormal contraction of the retinal arteries with secondary changes in the substance of the retina, and constitutes arteriospastic retinopathy.

The first picture is the one seen in essential hypertension, throughout the benign phase.

Exaggerated aging of the arteries, enhanced arteriosclerosis, and arteriolosclerosio, occur in the course of essential hypertension, in addition to the retina, in such organs as the brain, the kidneys, the pancreas, and the spleen. These changes are due to the continously increased resistance and tension on the part of the arterial walls against the pressure exerted by the blood flow in the arteries. The increased resistance and tension of the arterial walls helps maintain the normal blood flow in the organs in benign essential hypertension in spite of the increased blood pressure

Arteriospastic retinopathy occurs with arterial hypertension, and with abnormal contraction and narrowing of the arteries in the brain and in the kidneys, in diffuse glomerulonephritis, in preeclampsia and eclampsia of pregnancy, in some of the less common diseases of the kidneys, and in cases of pheochromocytoma.

Arteriospastic retinopathy is seen in some cases of essential hypertension after years of hypertension of a definitely benign

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82. Elwyn H. : Arch. Ophth. : Jan. 1956 : 55-1 : 3-8.

character, but without renal insufficiency. These cases constitute an intermediary group, between the group of strictly benign cases and the group in the malignant stage of hypertension.

Arteriospastic retinopathy added to the arterial changes of chronic hypertension, to which papilledema is frequently added, is seen in a small group of cases with permanent renal insufficiency. These are the cases in the malignant stage of essential hypertension.

83. Fundus Changes in Hypotony.

Four eyes of three patients, aged 63 to 82 years, developed severe hypotony after successful intracapsular cataract operations and subsequent cyclodialysis. This was followed by papilledema ex-vacuo and circumscribed macular edema which reduced the central vision. Also fine radial subretinal pigment lines appeared in the nasal half of the fundus in the first three cases. The follow-up study of these cases showed that the ocular hypotony was the essential cause of the macular changes but that degenerated vitreous and the advanced age of the patients involved probably played a precipitating role.

84. Vessels of the Ocular Fundus as a Guide to Prognosis.

In proportion to its size the ocular fundus has perhaps been more minutely surveyed than any part of the human frame, not even excepting the lens and cornea. Repeated ophthalmoscopic observations fortified by histological study and correlated with the rest of the clinical background make a foundation upon which the prognosis may be built. Complete certainty is seldom attainable, but marshalling of all the evidence does at least permit an approximate forecast. Although prognosis must be to a large extent based upon work done in the past, it is nevertheless essential to link up the facts with recent advances. New methods of therapy together with changing aetiological situations have within living memory altered the outlook in many important diseases, notably hyperpiesis and diabetes. The state of the fundus vessels will probably for a long time continue to be one of the more important considerations for all who seek to assess the cardiovascular system.

Changes in the ophthalmoscopic appearances of vessels in the fundus may supply guidance about the future prospects of (*a*) one

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[83] Dellaporta A. : A. J. O. : Dec. 1955 : 40-6 : 781-85.

[84] Doggart J. H. : B. M. J. : June 30, 1956 : 1501-7.

eye, (*b*) both eyes, and (*c*) the other organs and tissues of the body. Thus it is possible to say, when confronted with a typical instance of Coats's disease, that the affected eye is likely to deteriorate, but the second eye will probably escape. In Eales's disease, on the other hand, the chances are that the fellow-eye will be implicated, even if it betrays no pathological signs long after the disease has become manifest in the first eye. Characteristic alterations in the fundus vessels may also be evident in hyperpiesia, hyperpiesis secondary to non-cardiovascular disease, diabetes, haematopoietic maladies, and many other abnormal states.

The prognostic implications of retinal vascular phenomena are not always self-evident. Legitimate conclusions from them can only be achieved by careful weighing of the ophthalmic and systemic evidence. The role of spasm in the production of arteriosclerotic retinopathy is not yet settled, but it does seem probable that spasm has been too readily assumed as an explanation for events that are probably due to obliterative changes in the vessel walls.

85. Gliomas of Optic Nerve.

All patients suspected of harboring a tumor affecting the optic nerve should be given the benefit of exploration, and that radical removal of the offending tumor should be carried out in those cases in which it is feasible. Knowledge of the pathologic processes has made us extremely reluctant to advise removal of the ocular globe or orbital exenteration, since it may be possible to retain the eyeball and oculomotor function, and thus have a better cosmetic result.

86. Dominant Macular Dystrophy.

Macular lesions, ophthalmoscopically similar to those seen in recessive macular dystrophy of the Stargardt type with its sharp localization, are recorded as presumably dominantly inherited.

In a reported family the lesion was observed over three generations. The ophthalmoscopic appearances in the grandmother at the age of 83, and in the grand-daughter at the age of 24 were fairly similar. Disturbances in colour vision were common to both these patients and apparently to other affected members of the

[85]. Love J. G., et al. : Arch. Ophth. : Sept. 1955 : 54-3 : 386-91.

[86]. Sorsby A. and Daney J. B. : B. J. O. : July 1955 : 39-7 : 385-97.

family, but the degreee of disturbance in visual acuity varied considerably; in the youngest member vision was still full. In a collateral branch of the family markedly more severe central lesions were observed in a mother and daughter.

In a second family an essentially similar lesion was observed ophthalmoscopically in two sisters and in a daughter of one of them. Here, too, colour anomalies were common to the three affected persons, and it was only in the child that central visual acuity was grossly disturbed.

In a third family a central mottled reaction was present in a man aged 40 when central sight was beginning to fail, and in his two daughters, aged 13 and 10 years, who showed full vision with mildly mottled maculae; all three showed gross colour anomalies. As in the first family, a severe central lesion was present in a member of a collateral branch.

The findings in these three families suggest that dominant macular dystrophy does not differ ophthalmoscopically from recessive macular dystrophy of the Stargardt type. The differences lie in the mode of inheritance and the mode of onset. As against the fairly sudden onset and rapid course of recessive macular dystrophy, the dominant variety of the affection has no sudden onset and may apparently be silent, or relatively so, over many years; in most cases it probably becomes subjectively manifest at about the age of 40 by decline in central visual acuity, though anomalies in colour vision are apparently present very much earlier. The dominant type appears to run a slower and milder course than the recessive type, and only exceptionally do severe disturbances occur early in life; it is apparently also exceptional that the macular lesion takes the form of a marked central scar. Whether anomalies in colour vision are a pointing symptom of pathognomonic significance still remains to be determined.

Differentiation from congenital total colour blindness presents no difficulties, though many of the features of dominant macular dystrophy are mild variants of some of the essential symptoms of day blindness. The differential diagnosis from a dominantly inherited fundus affection beginning as a central lesion is indicated.

87. Macular Cysts.

(1) Five families of dominantly inherited, bilateral macular

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[87] Sorsby A., et al. : B. J. O. : March 1956 : 40-3 : 144-58.

cysts are reported. In two families observations extended over three generations and in three over two generations.

(2) Regular dominance was observed in four families; in the fifth the mother of two affected daughters was normal, though her father was affected.

(3) The affection shows the following features:

(*a*) It is probably congenital in character.

(*b*) There is nothing to suggest subjective change in the central fields, colour vision, and dark adaptation, during the quiescent stages of the affection.

(*c*) Visual disturbances tend to develop in middle age and are probably only slowly progressive. These disturbances appear to be determined by rupture of the cyst, followed by slow pigmentary degenerative changes, including the absorption of the anterior wall of the cyst.

(*d*) At the end-stage—presumably towards the seventh decade of life—a non-pathognomonic macular lesion is seen.

(*e*) The ophthalmoscopic appearances show both considerable intrafamilial similarity and interfamilial variation. An occasional variant of macular cyst is a non-pathognomonic pigmentation of the central fundus area.

88. Optic Neuritis Caused by Arsenicals.

Two cases with optic neuritis produced by "Stovarsol" were greatly improved by the administration of B.A.L., which offers a useful remedy in accidents that may still occur when the syphilologist considers that arsenical treatment must be applied.

(1) Subjective manifestations described by the patients (cloudy vision).

(2) Characteristic field changes, showing extreme contraction to a narrow oval shape with depression of the superior and inferior nasal sectors and a wedge in the temporal sector.

(3) Preservation of visual acuity.

(4) Ophthalmoscopic alterations.

This clear disagreement between the marked narrowing of the visual fields and the preservation of a reasonable degree of visual

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88. Oehninger C., et. al. : B. J. O. : July 1955 : 39-7 : 422-28.

acuity (indicating normality of the macular region), with absence of optic atrophy at least at the beginning of the process is characteristic of the optic neuritis produced by pentavalent arsenicals.

The peripheral field, except the papillo-macular region, is altered simultaneously and symmetrically in both eyes. This feature of the ocular syndrome excludes the possibility of optic atrophy of syphilitic origin in these two cases, since syphilitic involvement of the optic tract entails diminished visual acuity as well as narrowing of the visual fields and optic atrophy.

After treatment both patients were enabled to carry on their usual occupations, whereas before the advent of B.A.L. arsenical optic neuropathy offered a poor prognosis.

The favourable results in these two patients show that we now possess a therapeutic element of great efficacy, but a periodical check by an eye specialist during arsenotherapy should not be omitted.

89. Hereditary Infantile Optic Atrophy with Dominant Transmission.

On the basis of a study of 20 Danish families with about 249 affected members, the author discusses the syndrome of infantile optic atrophy with dominant transmission. The disease is characterized by its unnoticed onset in early childhood (the youngest patient of the series being 2 years of age) and an insidious course. The patients can, therefore, usually not state the time of onset. As a rule the visual impairment is not recognized until school age, and in mild cases it remains unnoticed. Slight progressions were, furthermore observed in several adult patients. Visual acuity ranged from normal to greatly, though not extremely, reduced values (2/60). In addition to the atrophy of the discs, there were mild macular changes consisting in absent or irregular foveolar reflex and at times in a slight displacement of the pigment in this area. Visual-field examination with white object usually revealed changes in the area between the centre and the blind spot in the form of an isolated paracentral scotoma or a scotoma fusing with the blind spot, appparently enlarging it. In severe cases it might reach the centre or occupy the entire central area of the upper or lower temporal quadrant.

The visual field with coloured object also showed characteristic

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[89]. Kjer P. : Dan. Med. Bull. : Aug. 1956 : 3-5 : 135-41.

changes, the perception of blue being poorer than of red. In more severe cases there was only a visual field remnant for red on the nasal aspect, whereas blue was not perceived at all.

There was no nystagmus. The transmission was dominant autosomal.

90. Retinal Detachment Surgery.

In the course of a study, all cases of surgically treated retinal detachment in the files of the University of California Hospital were reviewed. The operations performed before 1940 are described chiefly for their historic interest. In the period of 1940-1954, 123 cases were subjected to diathermy and, in 14 cases, also to scleral resections, in accordance with the principles of Gonin and the procedural recommendations of Pischel. In the 103 cases in which the final results were recorded cures were achieved in 64 per cent. After an initial failure, 24 patients underwent one or more additional operations and at least five of these were cured. Two patients were saved from total blindness by a fifth procedure. At this hospital, lamellar scleral resection is rapidly gaining favor as an initial procedure in complicated cases.

Two cases are presented in which cures for retinal detachment of long duration were effected in young patients.

For purposes of comparison a series of retinal detachment operations performed by two ophthalmologists prominent in the field of retinal detachment is presented . In 376 consecutive cases treated surgically during a three and one-half-year period, 75 per cent were cured as a result of 518 procedures, or an average of 1·7 procedures per patient. If the 63 cases that had undergone previous unsuccessful surgery elsewhere were eliminated the rate of cure was 81 per cent.

From a study of the preoperative, operative and postoperative management in the two series, it was concluded that painstaking attention to minute detail, particularly pre-operatively, was largely responsible for the markedly higher incidence of success in the private practice series.

91. Tears without Detachment.

In an eye with a retinal tear, of much more prognostic import-

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[90]. Asbury T. and Vaughan D. G. : A. J. O. : Feb. 1956 : 41-2 : 247-53.

[91]. Colyear B. H. and Pischel D. K. : A. J. O. : May 1956 : 41-5 : 773-92.

ance than over-all percentages is the type of tear and the relationship of the vitreous to the flap of the tear and the surrounding retina. If the retinal flap has become entirely separated from the retina and is floating freely about on the posterior face of the vitreous, the chances of a subsequent detachment of the retina from that particular tear are very much lessened; adjacent old chorioretinitis is also a good prognostic sign; it is likely that often (as mentioned by previous authors) the inflammation that initially led to adherence of the vitreous to the retina may have effected a subclinical adhesion of the retina to the choroid. If the retinal flap has not become entirely separated from the tear, constant movement of the eye with the consequent swirling and gyration of the vitreous must continually pull and tug on the flap of retina, tending to lift up the edges of the tear and allow a separation of the retina to develop.

The predisposition of the individual patient must also be brought into mind; if there has been a detachment in the fellow eye, the likelihood of the second eye detaching is great and prophylactic operation should be undertaken.

The presence or absence of vitreous hemorrhage, or of photopsia, has not proved a valuable prognostic sign in the authors' experience. There is no question as to the significance of these phenomena—a massive vitreous retraction does occasionally occur following a vitreous hemorrhage; photopsia indicates vitreous pull on attached retina—however, in the cases presented the percentage incidence of these two conditions was equally distributed among the patients, who did not suffer detachment and those who did. Therefore, as a prognostic sign in the presence of a retinal tear, these findings cannot be relied upon; in patients who have only a suspected retinal break, they are probably bad prognostic signs, signalling the development of a clincial tear.

The location of the retinal tear is more important if the flap is still attached than if the flap has become a free operculum. A flap above, with attached vitreous pulling and hanging on it, is quite likely to elevate the lips of the tear; whereas, if the tear is below, this result is less likely to occur.

These factors are valuable for prognostic reasons. Probably the safest procedure, however, is to operate all patients with a retinal break, regardless of type or location. Because he has the knowledge that certain conditions may be more or less favorable, the ophthalmologist is in the position to guide the decision of his patient toward prophylactic surgery rather than to temporize.

Twenty-six case histories are presented of patients with tears in the retina but without a detachment of the retina. Forty per cent of the patients did not develop a detachment, 20 per cent of the patients did develop a detachment, and 40 per cent underwent prophylactic surgery with successful results. To operate prophylactically is probably the safest course.

92. Retinal Detachment.

Advantages of scleral buckling with a plastic implant over classical diathermy or scleral resection :

A scleral buckling operation generally consists of the following: 1. The sclera is adequately exposed. 2. Localization of all the retinal breaks is made by ophthalmoscopy, a mark being made over each break on the sclera with a flat diathermy electrode. 3. A scleral lamella 4 to 6 mm. in width and one to three quadrants in length is excised. It is essential that the middle of the excised strip of sclera should be slightly posterior to the retinal breaks. However, when the breaks are anterior to the equator, the middle of the excised strip should be placed at the equator. 4. The area of scleral excision is covered with surface diathermy. 5. Mattress sutures are placed on the edges of the area of excision. 6. Subretinal fluid is released through a perforation made in the arc of scleral excision. 7. A tube of polyethylene, 1·00 to 1·50 mm. in diameter, is placed under the sutures. 8. The sutures are drawn and tied over the polythelene tubing. 9. A connection is made with surface diathermy between each end of the buckle and the ora serrata.

The advantages of the method may be summarized as follows : The treated area is pushed toward the retina as much as evacuation of the subretinal fluid will permit; this insures closure of the retinal breaks at the time of surgery, instead of later. It is unnecessary to give the patient preoperative bed rest, as this might diminish the quantity of subretinal fluid available and would make the buckling operation difficult and less effective. Postoperatively, the period of bed rest is limited to four to eight days; after this pinhole glasses are not used. It is remarkable that if

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[92]. Arch. Ophth. : July 1955 : 54-1 : 145.

the same preoperative and postoperative schedule is followed in cases of simple retinopexy, failure will often result.

The most important advantage of scleral buckling is that it is a very effective means of combating fixed retinal folds. The fixed fold is the major obstacle to reattachment of the retina. The frequent occurrence of an equatorial fixed fold makes it necessary to place the buckling no farther anterior than the equator. Because of its effectiveness against fixed retinal folds, scleral buckling makes it possible to reattach the retina in cases with an extremely poor prognosis.

93. Retinal Detachment.

All detachments may be divided into three categories :

1. "Simple detachments", or those which will reposition themselves on removal of the subretinal fluid.

2. "Complicated detachments", or those in which mechanical forces, such as retinal shrinkage, surface membrances, persistent strong vitreous traction, or agglutinated retinal folds, prevent the retina from repositioning itself against the wall of the eye.

3. "Borderline", or doubtful detachments, or those in which the surgeon does not have sufficient evidence to put them in Class 1 or 2 or those with the retina under weak vitreous traction, which while allowing the retina to get back to the wall, will, by the persistence of its pull, redetach it.

In Classes 2 and 3 scleral shortening is the procedure of choice and, when indicated, should be the primary procedure, for there is ample evidence that the diathermy reaction causes retinal and vitreous shrinkage and not only may convert a simple detachment into a complicated one but may put a complicated one beyond the reach of even the scleral shortening operation. In addition, it causes scleral necrosis and makes the scleral shortening procedure difficult or impossible in that area for two or three months.

In these last two groups lie the detachments in aphakia and high myopia and those of long standing, as well as the detachments characterized by foamy equatorial ridges, and multiple holes and those with angular holes whose edges are stiffly everted; but these surface characteristics are not sufficient criteria in themselves.

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[93]. Arch. Ophth. : July 1955 : 54-1 : 143-44.

The decision must rest on the most complete knowledge obtainable of the mechanical factors involved. A period of repeated observations with the patient resting comfortably in bed with eye bandaged for 48 hours should be a minimum.

94. Retinal Detachment.

The rationale and indications for the use of vitreous in retinal detachment :

In a symposium on retinal detachment held in New York on 17-1-1957, Dr. Donald M.Shafer said : "First, I want to explain what we are using and calling vitreous. This material, which is a sterile pooled aspirate of human vitreous, is what is extracted through an 18-gauge needle from eyes coming into the Eye-Bank for corneal transplants. I have called the operation a vitreous implantation. This is·not to be confused with vitreous transplantation, which is done in cases of hemorrhage. In implantation, we do not remove any vitreous, we are adding vitreous.

The factors which make up the rationale for the use of vitreous are basically three. The first I should call the anatomic factor. Anatomically, the retina is attached firmly at the disc and firmly at the ora. In between, it is attached only by the very nebulous processes of the pigment cells. So here we have a loosely attached structure suspended across that arc of the choroid and sclera, and the hypothesis was, and is, that the vitreous is the essential normal support to the retina in between its two strong attachments. By the same reasoning, it would seem logical to implant vitreous to help put back retina that is detached, and keep in place retina that has been reattached. Clinically we know, for example, that the incidence of retinal detachment following cataract extraction parallels, more than probably any other single factor, the loss of vitreous.

I feel that this factor probably is operative in most or all retinal detachment, in that the subretinal fluid is probably degenerated vitreous. Therefore, it represents a subtraction from the normal vitreous volume. Again, it wouldl ogically follow that implantation of more vitreous would represent more support to the retina.

The second factor in the rationale of vitreous implantation I call the surge factor, and this, of course, is not original with me.

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[94]. Arch. Ophth. : July 1955 : 54-1 : 146-47.

It is similar to the thinking of Lindner and it is that after the movement of the eye, the vitreous continues to move and pull on any point where it is attached. I believe most people will agree that many retinal detachments are preceded by vitreous detachment, in which the vitreous is detached posteriorly and comes forward.

It could be hypothesized, therefore, that this vitreous framework would be free to swing or pull on the remaining ora attachment in a low-viscosity medium presumably intraocular fluid, posteriorly. It would follow, therefore, that the implantation of more vitreous, a high-viscosity medium, would tend to reduce the amount of surge, and thus the amount of traction on the retina.

The third factor in the rationale is purely surgical : that is, by implanting vitreous, one is hydraulically pushing out subretinal fluid from behind the retina through the drainage hole and further pushing the retina up against the choroidal diathermy area.

The rationale consists, then, of implanting vitreous to supply more support for the retina, to reduce the surge factor, and to drive out the subretinal fluid, pushing the retina against the choroid.

As to the indications for the vitreous implant in detachment of the retina, I can probably best show them by presenting some slides; but before I do, I want to say we have now done between 65 to 70 operations with vitreous, not all of them in treatment of retinal detachment. I want to emphasize that we have never lost an eye. We have never had panophthalmitis or sympathetic ophthalmia. We have not had worse vision after operation than we had before operation even though we failed to attach the retina. The first slide will give an idea of the cases we were working with. One of the men at the Manhattan Eye, Ear and Throat Hospital said that we operated on everything but cases of phthisis bulbi, and there was some doubt about that. In no instance was a fresh case involved in this series. They are all what Dr. Clark called Class 2 or Class 3 cases. The cases are consecutive, and there was no selection. It must be stressed that every case was a previous failure, at least once, with an accepted technique.

The preoperative status of the 42 consecutive cases of vitreous implant for retinal detachment included 3 cases of Slaine implant plus diathermy failure; 12 case of previous scleral resection, drainage, or shortening failure; 14 cases with three or more diathermy or scleral surgery failures; 16 cases of aphakic detachment; 8 cases of previous diathermy failure with fixed folded retina; 22 cases of total retinal detachments, and 8 cases with fixed vitreous bands. Most cases included one or more of the above characteristics.

Of the 42 cases which I said were all previous failures by an acccepted technique, 16 had aphakic detachment; in 44% of these the retina was reattached. Of the 22 cases with total detachment, 37% had the retina reattached. Of 22 cases with myopia of lesss than 5 D, 55% had reattachment; of the 4 with 5 D. or more of myopia, 25% had reattachment. Of the eight cases with fixed vitreous bands, 50% had reattachment. These results show the indications for vitreous implant."

95. Retinal Detachment in Herpes Zoster.

Three cases of retinal detachment as a complication of herpes zoster ophthalmicus are reported. All were characterized by presence of iridocyclitis, bulbous detachment, and the tendency for spontaneous reattachment. In only one case was a hole found and treated. The mechanism of detachment is thought to be an exudative choroiditis.

96. Retinal Vascular Occlusion Therapy.

In arterial occlusion, as soon as possible after hospitalization, anticoagulation therapy is instituted. In this respect the treatment of the arterial and of the venous occlusions coincides. Heparin sodium (Depo—heparin sodium) in a 300 to 400 mg. dose according to weight is immediately given subcutaneously, followed by a slightly smaller amount in 24 hours to maintain a clotting time of approximately 20 to 30 minutes. A third injection may be given the third day if bishydroxycoumarin (Dicumarol) or ethyl biscoumacetate (Troxmexan), which was also given by mouth on admission, has not become effective. Bishydroxycoumarin is given in 300 mg. amounts on the first day, 200 mg. doses the second day, and 50 to 100 mg. doses thereafter, in order to keep the prothrombin time at a level of 20% to 30%. During hospitalization ethyl biscoumacetate may be

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[95]. Lincoff, H. A., et al : A. J. O. : Feb. 1956 : 41-2 : 256.

[96]. Anderson, B. and Vallotton W. : Arch. Ophth. : July 1955 : 54-1 : 6-12.

used in preference to bishydroxycoumarin. This is a more rapidly acting drug. The intial dose is 1800 mg., followed on the second day by 600 or 800 mg., and 150 mg. daily thereafter. Bishydroxycoumarin in daily amounts of 75 to 100 mg. for the average ambulant, nonhospitalized patient is preferred. This amount will usually keep the prothrombin time at a level of 20% to 30%.

In the past the authors have also used nicotinic acid in flushing doses, although recent evidence tends to invalidate this as an effective dilator of cerebral and ocular blood vessels.

It is worth while to continue anticoagulant therapy for 30 to 60 days in most cases. While this would scarcely be worth while in consideration of the vascular occlusion alone, it is well to remember that the ocular disease in man is only a surface manifestation of a more profound disturbance. One of the authors' untreated patients with arterial occlusion, 24 years of age, died suddenly within a few weeks after the arterial occlusion. Another man, mentioned above as recovering normal vision after arterial occlusion treated with acetylcholine, died suddenly with coronary occlusion some four years after the ocular difficulty.

In two of the later cases of temporal arteritis corticotropin and cortisone were used unsuccessfully in an effort to reduce the inflammatory thickening of the arterial wall. Phenylbutazone (Butazolidin), a nonhormonal anti-inflammatory agent, might also be considered in this connection.

An attempt has been made to differentiate etiologically 120 cases of retinal arterial and venous occlusion. Arteriosclerosis and hypertension could be casually related to one-third of the arterial occlusions and to one half of the venous occlusions. In this group there was no evidence of therapeutic effect on the arterial occlusions, but from the limited number of cases available for comparison, therapy might be beneficial in the venous obstructions. Therapy seemed to be most effective in the infectious or postinfectious group in both the arterial and the venous obstructions. In the unknown group, on the arterial side, two of four occlusions improved under therapy, while no improvement was noted in six untreated cases. On the venous side in this group the results were equivocal. The failure of corticotropin in the two cases of temporal arteritis was disappointing. The cases differentiated under other etiological groups were not of sufficient number to indicate any trend in therapeutic effect. Other studies which have preceded this report are in general accord with the conclusion that anticoagulant therapy is justified in both arterial and venous retinal occlusions; that the results in the hypertensive arteriosclerosis group will be poor, but that in those occlusions associated with infectious processes therapy adds appreciably to the possibility of restoration of function.

97. Deafness in Retinitis Pigmentosa.

Fourteeen out of 22 patients, aged 11 to 56 years and suffering from retinitis pigmentosa, showed impairment of hearing when tested audiometrically. Vestibular tests were performed in fourteen cases and ten of these gave a normal caloric response.

Four offsprings of two patients with retinitis pigmentosa showed normal audiometric values although their scotopic vision was impaired.

The relationship between the visualand acoustic lesions is discussed. It is suggested that impairment of scotopic vision is more common than disturbed acoustic function in the children of patients with retinitisp igmentosa.

98. Pathology of Retinitis Pigmentosa.

The histological findings in two cases of retinitis pigmentosa have beeen described. One is of interest because it shows an abnormality of the choroid noted in only two previous cases and the other because it is the first case with a dominant mode of inheritance to be examined pathologically.

The cases of retinitis pigmentosa previously recorded in the literature have been reviewed with particular reference to inconsistent findings in the choroid and the variable occurrence of optic atrophy. The possibility of more than one type of the disease is considered. The discrepant findings could not, however, be correlated with the mode of inheritance.

99. Retinochoroiditis and Uvetis-Etiology.

A review of some of the literature on toxoplasmosis affirms the almost universal prevalence of the disease in man and animals, its affinity for nerve tissue, its resistance during the encysted stage, its responsibility for encephalitis and retinitis in some in-

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[97]. Landau J. and Feinmesser M. : B. J. O. : Jan. 1956 : 40-1 : 40-44.
[98]. Lucas D. R. : B. J. O. : Jan. 1956 : 40-1 : 14-23.
[99]. Cassady J. V. et al : Arch. Ophth. : July 1955 : 54-1 : 28-36.

fants, the difficulty of being sure it is the cause of ocular disease in adults, and our failure to understand its transmission. Because of its widespread presence in almost all the adult population, Sabin, Feldman, and others have been reluctant to accept it as a cause of ocular disease. Sabin and Feldman made the most important contribution to our recognition of this disease, the cytoplasm-modifying (dye) antibody test. Wilder, Duke-Elder, Woods, Jacobs, Frenkel, their associates, and others have presented strong evidence, in spite of earlier teaching to the contrary, that adult ocular disease is often due to toxoplasmosis. Its frequency as an etiologic factor is now being realized.

Because the cytoplasm-modifying antibody test for toxoplasmosis was available locally, it was possible to study cases of retinochoroiditis and uveitis to determine if toxoplasmosis was a possible etiologic factor. The ocular lesions presumed to be caused by toxoplasma were uveitis, iridocyclitis, and retinochoroiditis, either fresh local lesions or an activation adjacent to an old healed retinochoroiditis. Clinical and serologic studies of these patients to determine the cause of their ocular disease were almost entirely negative for other causes of their uveitis, but a number of patients were found to have significantly positive cytoplasm-modifying antibody tests for toxoplasmosis.

The toxoplasmic origin of retinochoroiditis or uveitis in these cases is presumptive. But in the past, when there was a positive Mantoux test, we have deduced that the retinochoroiditis was tuberculous, although we did not have positive proof of such an etiology. The methylene blue dye test titer in a series of 23 cases was sufficiently high for a diagnosis of toxoplasmic disease. When this diagnostic test (the dye test) is not readily available, ophthalmologists often look askance at such a high incidence of toxoplasmic etiology. But where these tests are easily obtained, as in this series, toxoplasmosis seems to be a relatively frequent cause of retinochoroiditis. Woods and Jacobs, Ryan and Hart, and associates, and Passmore recently emphasized this fact. It would seem that we should revise our attitude that acquired toxoplasmosis in the adult is symptomless and does not cause eye disease.

In two of the patients systemic administration of cortisone aggravated the inflammation of the eye. Ryan and Passmore also noted this peculiarity of toxoplasmic uveitis treated with cortisone, i. e. that whereas most eye inflammations were allayed by cortisone, the toxoplasmic form on occasion was intensified. A chronic, prolonged, recurring inflammation was characteristic of almost every one of these cases of toxoplasmic uveitis. Tuberculous uveitis also is protracted, but not to such an extent as is this ocular disease. We are hopeful that the severity and duration of the uveitis may now be influenced favourably by pyrimethamine and sulfadiazine, which was so effectively used in some of the present cases. In differentiating whether the etiologic agent is tuberculosis or toxoplasmosis, the therapeutic response may be helpful.

The sera of 36 patients with vascular or inflammatory disease of the posterior uvea were examined with the serum-modifying antibody dye test of Sabin and Feldman. The sera of 23 of these patients were positive for toxoplasmosis, while a survey for any other etiologic cause for their ocular inflammation was negative. In 7 patients the disease was inactive or quiescent, while in 16 it was active. Eleven patients with active granulomatous uveitis were treated with pyrimethamine and sulfadiazine systemically, producing a marked and dramatic improvement in the uveitis. The treatment may be dangerous and should be used only when blood studies are carefully followed.

Retinochoroiditis or granulomatous uveitis may be caused by tuberculosis or toxoplasmosis, but accusation of either must be presumptive. The appearance of the lesion; the clinical, serologic and diagnostic tests, and the duration and severity of the lesion must be considered. If the serum-modifying antibody test is readily available, toxoplasmosis as an etiologic cause of eye disease in adults, as well as in infants, will be found more frequently than we formerly believed.

In order that uveitis may be managed intelligently, the treatment must be directed to its cause. If such a high percentage of retinochoroiditis and granulomatous uveitis is due to toxoplasmosis, a complete etiologic survey is not possible without the cytoplasm-modifying antibody dye test of Sabin and Feldman. This test should be made more readily available.

100. Central Serous Retinopathy.

Central serous retinopathy, and the related if not identical condition, disciform degeneration of the macula, is a not uncommon condition in the South of England. It shows the usual predilection for males but no special adult age group is affected; disciform degeneration tends to develop in the older subjects. People engaged in responsible positions requiring high visual acuity tend to present themselves at hospital more frequently than others, especially if the affliction is unilateral. Bilaterality is not very common, and its presence shows no relationship with age. Duraation of attack increases (but not significantly) with age; visual prognosis however, deteriorates significantly as age rises and is distinctly bad in disciform degeneration. Attacks occur at any time of the year. The incidence of stress diseases, a tense obsessional mental " make-up ", and a history of stress-producing life situations, were high in the subjects affected. Peptic ulceration and migraine showed a rather high but not significant frequency of association. The value of vasodilator and cortisone therapy remains unproven, but there may be a place for some kind of psycho-therapy.

101. Retinopathy in Unselected Diabetics.

The fundi of 500 unselected diabetics were examined to determine the incidence of diabetic retinopathy in the diabetic population and the relationship of the degree of retinopathy to control, severity and duration of the disease.

The basic lesions of diabetic retinopathy were considered to be small round hemorrhages and small, sharply defined, hard yellow-white exudates. For the purpose of study, the patients with retinopathy were grouped into four categories ranging from involvement with few hemorrhages and exudates to the typical proliferative retinopathy. Any additional fundus lesions which were not considered to be a part of the true diabetic retinopathy were listed under separate headings.

Venous aneurysmal dilatations were subjected to special study, since at the present time they are considered to be one of the earliest signs of diabetic retinopathy. They were present in only 37

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[100]. Bennett G. : B. J. O. : Oct. 1955 : 39-10 : 605-18.

[101]. A. J. O. : Sept. 1955 : 40-3 : 430-31.

(7·4 per cent) of the 500 cases in this series. Of these 37 cases only nine were found in otherwise normal fundi.

Arteriosclerosis was found to be present in only 100 cases (20 per cent.).

Some degree of diabetic retinopathy was present in 216 (43·2 per cent) of the cases. Of the total diabetics only 34 cases (6·8 per cent) fell into categories III and IV (Severe and very severe retinopathy).

The standard criteria of diabetic control were used to place the patients into three groups of good, fair and poor control. It was found that there was little correlation between the control of the diabetic patient and the incidence and severity of the retinopathy.

Similarly, the severity of the clinical diabetes seemed to have very little influence on the degree of retinal involvement. Severity in contradistinction to control, included the incidence and degree of diabetic complications such as gangrene, peripheral vascular disease, and arteriosclerotic heart disease.

There is a definite increase in the incidence of diabetic retinopathy of all types with the passage of time. Of 228 cases in which the duration of diabetes was five years or less, retinopathy was present in 64 patients (28 per cent). In 107 cases in which diabetes was present for 5 to 10 years, retinopathy was present in 48 cases (45 per cent). In those cases in which diabetes had been present for 10 years or longer the incidence of retinopathy rose to 61·5 per cent and remained at approximately this level regardless of the duration of the disease.

102. Acute Bilateral Retrobulbar Neuritis.

In June 1954, a clergyman aged 42 complained of dimness of vision of the left eye and neuralgia over the left frontal region. Within 48 hours the left vision was limited to counting fingers. Ocular movements were full but painful and there was tenderness on palpation over the insertion of the superior rectus muscle. The pupil reaction to light was of the typical Marcus Gunn type. The optic disk was normal. Acute retrobulbar neuritis was diagnosed. Five days later there was blurring of the disk margin, with no perception of light. Ten days later the optic disk was

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[102]. Rose D. : B. M. J. : August 11, 1956 : 345.

definitely pale. Throughout these events the right vision was 6/6 and the right eye normal.

In view of the severity of the left visual loss he was admitted to hospital. The Wassermann reaction, E. N. T. examination, blood count, X-ray film of the skull, and examination of the teeth all showed no abnormality; neurological examination revealed, apart from the ocular changes, no abnormality in the central nervous system. Eleven days after the onset of symptoms in the left eye he suddenly found that the smaller newspaperprint could not be seen by the right eye. The right ocular movements were full, with no pain on movement or tenderness on palpation. The reaction of the right pupil to direct light was poorly sustained. The right optic disk and the fundus appeared normal. Within 24 hours the right vision had fallen to 6/18. The right peripheral field was temporally contracted midway to fixation point. A considerable scotoma extending to 30 degrees above and below and to the temporal side of the fixation point was present.

Corticotrophin, 10 units six-hourly, was given. After three injections the right vision recovered to 6/9. The right optic disk was slighly paler than normal, but there was no oedema of the disk or fullness of the veins. There was pallor of the left optic disk—a rather surprising finding in view of the brief history. The right visual field was full to 3/330, but on the Bjerrum screen there was a small scotoma on the temporal side only, partial to 2/1000 in a semicircle upto 6 degrees from the fixation point and complete in a further 2 degrees semicircle external to this. It was considered that the only possible diagnosis was bilateral retrobulbar neuritis of the nature of Devic's disease.

Corticotrophin, 10 units six-hourly, was continued for 10 days, after which the vision began to fail again and a further scotoma developed. Corticotrophin was increased to 50 units in 24 hours and continued for 17 days. Then 20 units was given, and this amount was gradually lowered until corticotrophin was discontinued altogether 10 days later. By that time the right vision had recovered to 6/6 and Jaeger 1. The peripheral field was full. Only a minute partial scotoma remained in the lower temporal area. Twenty months later these findings for the right eye were unchanged. With the left eye hand movements are seen in the upper nasal field; there is no projection of light elsewhere.

At no time has there been any associated myelitis, but the two classical components of Devic's disease are by no means invariably associated. The severity of the attacks of bilateral retrobulbar neuritis, their close association in time, the response to corticotrophin therapy, and the complete absence, then or subsequently, of any other abnormal signs in the central nervous system are very strongly suggestive that this was, in fact, an incomplete form of neuromyelitis optica rather than a manifestation of other demyelinating diseases of the central nervous system, such as a multiple sclerosis.

103. Therapy of Retrolental Fibroplasia.

Retinal edema in prematurity is one of the most important warnings of the presence of retinal hypoxia. It may be the first or single symptom of retinopathy of prematurity and has, therefore, to be considered as an imminent danger to the visual faculty of the child.

A case of retinal edema in a premature infant with a birth weight of 1000 gm. is reported. The child had beeen kept in an oxygen concentration of about 65% during its first month of life. No ocular anomalies were present at the end of this month. Retinal edema developed within one week after withdrawas of the oxygen supply. The child was treated with oxygen during a period of more than two months after its first withdrawal from the oxygen tent. In these months the edema reappeared four times after the oxygen concentration had beeen reduced, and disappeared every time after reinstitution of the oxygen treatment, at a higher level. A definite cure was established after the child had reached a weight of 3000 gm.

It is concluded that the consulting ophthalmologist of a premature nursery should advise active treatment with ophthalmol scopically controlled, careful administration of oxygen in all cases of retinal edema or other initial symptoms of retrolentafibroplasia in premature infants.

104. Pathogenesis of Retrolental Fibroplasia.

The effect of gradual lowering of the oxygen concentration on the oxygen-induced disease of the young mice has beeen studied

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[103]. Manschot W. A. : Arch. Ophth. : Oct. 1955 : 54-4 : 596-601.

[104]. Gyllensten L. J. and Hellstrom B. E. : A. J. O. : April 1946 : 41-4 : 619-27.

and compared with frequency and intensity of the eye change in animals rapidly withdrawn.

2. The gradual lowering of oxygen concentrations resulted in an initial retardation of both normal and pathologic vascularization of the retina. Following a prolonged observation, however, with a longer stay in air, this difference was no longer obvious.

3. Changes of hyaloid vessels, irregularities, and atrophies of retinal layers are not significantly influenced by the method of transfer to air.

4. The study does not support the view that oxygen-induced changes of the eyes of mice can be prevented by a process of weaning.

5. It is pointed out that, although many similarities exist between the oxygen induced changes of the mouse eye and the early pathology of retrolental fibroplasia, there are also many differences, especially concerning the final outcome of the respective diseases. Conclusions from animal experiments, including the influence of the process of weaning, should be drawn cautiously.,

105. Etiology of Retrolental Fibroplasia.

Hypotheses of the etiology of retrolental fibroplasia, other than those concerned with the use of oxygen, have failed to receive confirmation. Retrospective studies initially suggested that the incidence of the disease was correlated with exposure of the premature infant to oxygen. A study using alternate controls provided more convincing evidence of the relation between the use of oxygen and retrolental fibroplasia.

A national co-operative study involving 18 hospitals was designated to evaluate quickly in a controlled clinical trial not only the association between the use of Oxygen and the incidence of the disease but the mortality risk involved in the use of drastically curtailed amounts of oxygen.

Premature infants who weighed three pounds and five ounces, or less, at birth and who surived 48 hours were randomly assigned to one of the following two regimens of oxygen administration :

1. A routine oxygen group a received approximstely 28 days of oxygen at concentrations of at least 50 per cent.

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[105]. Kinsey V. E. and Hemphill F. M. : A. J. O. : Aug. 1955 : **40-2 : 166-74.**

2. A curtailed oxygen group which received oxygen only on the basis of frank clinical need.

All other conditions concerning the care of the infants were kept as constant as possible.

This report shows that there was no significant difference in mortality of infants in the two groups. The incidence of both the active and cicatricial forms of retrolental fibroplasia, however, was significantly higher in the group which received routine oxygen.

The incidence of the cicatricial form of retrolental fibroplasia has thus far been found to increase with the duration of exposure of the infants to oxygen during the first 10 days after entry in the study, but to increase little more with additional exposure. These observations suggest that some initial insult occurs to the eyes which is associated with relatively short exposures to oxygen.

The data indicate that (1) limiting the amount of oxygen used in the care of premature infants to that required for clinical emergency is without effect on the survival rate of the infants; (2) the incidence of retrolental fibroplasia is positively associated with the use of oxygen; and (3) much of the deleterious effect appears to be associated with exposure to oxygen within the first 10 days of life.

Therefore, it is concluded that pediatricians should restrict the use of oxygen to those minimal amounts which on the basis of frank clinical need are required for the survival of the infant.

106. Management of Retrolental Fibroplasia.

All theories concerned with the etiology of retrolental fibroplasia excepting that concerned with oxygen have failed of confirmation. The authors feel that they can recommend with confidence a program entailing a more rational use of oxygen in the management of the premature infant and that we may anticipate a significant drop in the incidence of this disease, which has become the greatest cause of blindness in children.

While great advances have been made in the better understanding of the etiology of retrolental fibroplasia, it is probable that even with judicious use of oxygen there will be occasional cases of retrolental fibroplasia. It is hoped that future investigations will reveal other etiologic factors.

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[106]. Reese A. B. : A. J. O. : **Aug. 1955 : 40-2 : 186-87.**

It must be remembered, however, that use of oxygen is sometimes a life-saving measure, and it will be necessary to continue its use for infants with cyanosis and definite signs of respiratory distress.

Pediatricians throughout the country are taking the facts into consideration in the management of newly born prematures. The indications for oxygen administration are now considered to be fewer than they have been in the recent past. Cyanosis and respiratory distress are held to be bonafide symptoms requiring oxygen therapy. However, there is a growing conviction that irregular or periodic respirations unaccompanied by other signs of distress do not require oxygen administration. When oxygen is indicated, every effort is made to keep the concentration in the incubator below 40 per cent and to discontinue treatment as soon as respiratory distress is relieved.

The authors feel that there is insufficient evidence available to support the idea that retrolental fibroplasia is benefited by oxygen therapy.

There is insufficient evidence available to warrant a statement that the rate of withdrawal affects the ultimate outcome of the disease. Controlled animal experimentation should help clarify this important issue.

The remarkable similarity between the oxygen-induced experimental lesions and the lesionsof early human retrolental fibrsoplasia suggest that the true counterpart of human retrolental fibroplasia has been produced. Because of the close identity of the animal and early human lesions, data obtained from animal experiments can be applied with reasonable confidence to problems in human retrolental fibroplasia. One inconsistency, however, is the infrequency of retinal detachment in the oxygen treated animals. The data paresented show that the common denominator in all the animal experiments is a susceptibility to oxygen where the retina is incompletely vascularized and a resistance to oxygen damage where vascularization is complete.

107. Vascularization of the Optic Pathway. III.

The staining method of Pickworth, modified by Fazio (sodium nitroprussate, benzidine, and oxygen water) and the study of serial sections of the optic nerve give the following results :

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[107]. **Francois J. and Neetens A. : B. J. O. : Jan. 1956 : 40-1 : 45-52.**

1. At and behind the level of the lamina cribrosa collateral branches of the central retinal artery occur, but they are destined only for the retina.

2. In the optic nerve itself there is a complete absence of nutritive collaterals of the central retinal artery.

3. Capillaries may come into close contact with the central artery and vein, but have no direct communication with it; they occupy the role of vasa vasorum.

4. The existence of the transverse and longitudinal capillary systems is confirmed and their intimate structure is described in detail.

5. A central artery of the optic nerve undoubtedly exists.

6. Arterial branches run antero-posteriorly and venous branches run radially.

7. In the intracranial part of the optic nerve the axial system disappears and is replaced by several small independent arterioles.

8. The continuation of the capillaries of the optic nerve to meet the retinal circulation is proved; in this way cilio-retinal capillary anastomoses are effected.

9. A special type of capillary pattern is described in the intracranial part of the optic nerve; here the capillary system is irregular, showing hair-pin-like bends on the temporal aspect of the nerve from which the vessels run mostly to the chiasma.

SQUINT

108. Permanent Convergent Squint—Early Operation.

A series of cases of permanent estropia in which squinting commenced at the age of 6 months or later, thus representing two-thirds of all cases of permanent estropia, were operated upon 0·5-4 years after the development of the squint. The material comprises 70 cases. After one to three operations, 73% -- 77% obtained binocular fixation.

Of the material, 64 cases could be followed up until an average age of $11\frac{1}{3}$ years, the limits being 9 to 17 years. During the period of observation, 29·4% of the cases with binocular fixation lost this function, and some of them were operated upon again. Of the cases which still squinted, approximately half

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[108]. Nordlow W. : Arch. Ophth. : Jan. 1956 : 55-1 : 87-100.

obtained spontaneous binocular fixation. At the conclusion of the period of observation, 73·5%—78%· possessed binocular fixation.

Of the cases with binocular fixation, one third had orthophoria and two-thirds heterophoria at the final examination; 55%—59·4% were cured, with good binocular vision; 14·7%—15·6% had defects in binocular vision, and 15·6% had cosmetic cure only. Among 64 cases, the visual acuity of the squinting eye was less than 0.3 in 5 eyes and greater than this in the remainder. The result is significantly better than in a control material not operated upon but otherwise treated in the same manner.

The method of determining the visual acuity prior to operation in a child below the age of 3 to 4 years by observing his manner of fixating a point of light and of determining the presence of binocular vision after operation with " binocular fixation " has rendered satisfactory result. The method may therefore be recommended.

An investigation of the mechanism of development of esotropia in the light of the results obtained has revealed a mechanical factor as the only tangible cause in at least 70% of the cases, and probably more.

109. Developmental Anomalies in Vertical Muscle Defects.

The clinical significance of vertical anomalies has yet not been determined.

Although our concept concerning horizontal anomalies is fairly well developed, information relating to vertical anomalies is comparatively meagre. This is understandable when one considers that operations on vertical muscles are relatively infrequent, and that the field of operation is limited so that the structures are not sufficiently exposed for accurate inspection. Lack of familiarity with the complex anatomy of the area makes comparison with the normal difficult, especially when the deviation is mild in degree.

With the hope of establishing a more definite basis for an opinion concerning the role of anomalous development in vertical defects this presentation has attempted to assemble some tangible evidence pertaining to anomalous developments of the vertical mechanism and to evaluate their role as a mechanical obstacle to binocularity.

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[109] Fink W. H. : A. J. O. : Oct. 1955 : 40-4 : 529-52.

An analysis of available data indicates that vertical anomalies do occur. They tend to occur in certain areas, and they create mechanical obstacles in proportion to their degree. Our knowledge concerning vertical anomalies is too incomplete to attempt an opinion concerning the frequency of their occurrece. The more complex anatomy of the vertical region suggests the possibility that more anomalies may occur there than may occur in the horizontal region.

It is not merely of academic interest but of practical importance to recognize a vertical anomalous formation. Our present day approach to the vertical problem is handicapped because of the obscure etiologic basis. It is usually possible to determine that the underaction of an ocular muscle is due to a mechanical defect, but whether or not it is anomalous is difficult to determine. It is important in the management of such a case to make a positive determination if possible, because it may influence the procedure. The surgical handling of an anomalous state may be far different from that of a paresis of the muscle. The value of exact diagnosis is apparent when one realizes that the mere separation of an anomalous adhesion may correct the muscle defect and thus prevent the mutilation of a normal muscle.

It is hoped that this presentation will serve to stimulate further interest in the subject of vertical anomalies so that an opinion based on more complete data can be arrived at. That such an opinion is important seems evident when one considers the important role vertical defects play in ocular imbalance.

110. Eccentric Fination in Amblyepia Ex. Anopsia.

In a series of 98 cases of strabimus with eccentric fixation, the vision in the amblyopic eye was always less than 20-200, and usually less than 8/200.

The results of adequate occlusion therapy in 58 of these cases have been very encouraging. If occlusion was started before the age of 4 years, all cases obtained normal vision, and in many cases normal vision was obtained even up to the age of 12 years.

The age when occlusion was started was of greater importance than the age of onset of the squint. The older children were usually less willing to forego useful vision for a sufficient period to make proper occlusion effective.

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110. Urist M. J. : Arch. Ophth. : Sept. 1955 : 54-3 : 345-50.

111. Esotropia and Fixation Disparity

Fixation disparity is the amount by which the visual axes miss exact intersection at the point of regard during single binocular vision. It belongs primarily to the classification of heterophoria but may occupy an intermediate status between heterophoria and heterotropia.

Objective cover tests differentiate the two conditions in only a single given example. Subjective sensory tests likewise do not clearly differentiate them.

The physiologic basis of convergent fixation disparity is discussed with especial reference to its laboratory determination, and that existing in the state of nature.

Patients with a small degree of estropia usually cannot be successfully treated. Patients with a small degree of convergent fixation disparity usually need not be treated.

The importance of studying the differential characteristics of these states rests in increasing knowledge of the differential pathogenesis of convergent and divergent strabismus.

The study is confined to convergent ocular deviations since similar dignostic studies do not pertain to divergent ocular deviations.

112. Aspects of Exotropia.

1. A total of 324 cases of exotropia were studied.

2. Exotropia occurs approximately one third as often as does esotropia.

3. The following classification for exotropia is recommended :

Intermittent exotropia.
Constant alternating exotropia.
Constant uniocular exotropia.

4. Intermittent exotropia constitutes 85 per cent of all cases of exotropia; the term refers to those cases which at times show manifest divergent strabismus and at time heterophoria, on the basis of temporal and spatial measurement of the squint. .

5. Exophoria-exotropia is that condition in which for any given distance of the object of fixation, the patient will at times

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[111]. Jampolsky A. : A. J. O. : May 1956 : 41-5 : 825-832.

[112]. Schlossman A. and Bourchoff S. A. : A. J. O.: July 1955: 40-1: 53-64.

show an exotropia and at times an exophoria of approximately similar degree.

6. The characteristics of the various sub-groups of intermittent exotropia were studied from the points of view of measurements for distance and near and of near-point of convergence.

7. The incidence of myopia, emmetropia and hyperopia parallels that of the general population.

8. Only five per cent of cases with intermittent exotropia are benefited by the correction of myopia, and here the effect is mainly on the measurement for near.

9. In intermittent exotropia it appears that fusion in the primary position is more apt to be "all or none" for distance fixation than for near: if present, it is more likely to be constantly present, or, if absent, to be totally absent. At the near measurement, fusion in the primary position is usually present or intermittent, and very rarely absent.

10. In 16 per cent of cases the deviation was greater for distance than for near; in 31 per cent approximately equal for distance and near; and in 53 per cent greater for near than for distance.

11. Although some cases fall into the classification of divergence excess and convergence insufficiency, the vast majority do not, and it is urged that the use of such catregories be emphasized.

12. Constant alternating exotropia constitutes approximately six per cent of exotropia; such cases are similar to those of intermittent exotropia except that fusion is weaker. Hence, the patient does not exhibit exophoria even part of the time.

13. Constant uniocular exotropia constitutes about nine per cent of exotropia. It differs from the other two types in that the strabismus is probably secondary to amblyopia, since a well defined obstacle to clear vision in one eye can be demonstrated in most cases.

14. It has been shown that exotropia and esotropia differ fundamentally from the points of view of :

(a) Incidence in the general population.

(b) Percentage of incidence of the different types of esotropia and exotropia.

(c) Etiologic differences of the types.

(d) Relation of the strabismus to amblyopia.

(e) The role of the refractive error.

(f) The role of heredity.

113. Paralysis of the Ocular Muscles.

653 cases of acquired ocular paralysis were studied by the authors. The largest group by far comprised those of undetermined origin. Injury to the head accounted for the next largest number; more than half of these injuries were sustained in automobile accidents. Cerebral neoplasms caused diplopia more often by paralysis of the sixth nerve than by interruption of the third or fourth nerve. Occlusive vascular disease apparently accounted for many of the pareses. Aneurysm most often implicated the third nerve. When it did, with few exceptions, the pupils were affected. Syphilis was responsible for involvement of the third or sixth nerve in only 13 cases. It did not involve the fourth nerve in this series. Multiple sclerosis accounted for seven cases of paralysis of the sixth nerve. It was suspected in seven other cases, which were included in the group of undetermined cases. The authors have no example in which it affected the third or fourth nerve. The other causes for the most part were inflammatory.

The large proportion of cases in which the cause was undetermined is embarrassing but not altogether surprising. When isolated paralysis of a muscle of the eye is the first manifestation of a disease, determination of the cause may not be possible until other signs appear. The first examiner may not possess enough evidence to make a diagnosis. A later examiner may be aided by the passage of time and future developments.

114. Strabismus

Age of Operation. —This is difficult to assess because "early" can mean anything from 1 to 7 years. A number of authors advocate early operation without giving the actual age. James sees a recent change to early operation in Belgium. Thomas advises early operation as soon as other measures fail, to permit normal development. Law says the sooner the better for binocular vision. Others give definite ages. Costenbader operates at the age of one year when it is indicated. Dr. Jaeger and Bernolet favour operation before 3

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[113] Rucker C. W. et al : A. J. O. : June 1956 : 41-6 : 951-55.

[114] Wheeler M. C. : Arch. Ophthl. : July 1955 : : 54-1 : 100-34.

years in order to allow the eye to develop macular function. Hamburger advises operation after the fifth year if there is no progress from orthoptics. Jonkers waits until the child is old enough for training. Dejean thinks that age is of little importance but waits until local anesthesia can be used. In addition to those supporting the French report, there are still a few opposed to early operation, that is by the age of 7. Lynn holds this opinion because she cannot be sure that the axes are really aligned, anomalous correspondence may already be present, the parents may stay away if the eyes look straight, amblyopia may develop undetected, and there is risk of later deviation.

115. Subnormal Binocular Vision and Peripheral Fusion.

An analysis has been made of the state of binocular vision of 200 consecutive and unselected patients with convergent squint treated during the period 1950-54 by operation and/or orthoptic treatment and occlusion. The patients were divided into three groups :

(1) Those with binocular single vision.

(2a) Those with subnormal binocular vision.

(2b) Those with grossly defective binocular vision.

To discover whether visual judgement was better in patients with "subnormal binocular vision" than in those with a gross defect of binocular vision, twenty patients from each group were examined on the Livingston rotating depth perception apparatus. All the patients in Groups 2a and 2b gave a poor performance as compared with those in group 1, and if anything, the performance of those in Group 2a was slightly worse than that of those in Group 2b.

A series of the patients with subnormal binocular vision was examined to determine the presence of peripheral fusion.

Twenty patients with subnormal binocular vision (and fifty controls with binocular single vision) were examined by the screen test, and thirty patients with subnormal binocular vision (and twenty controls with binocular single vision) were examined by the stereoscopic test.

The results are varied and inconclusive owing to the subjective nature of the test, but peripheral fusion with a varying intensity of

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[115] Keith Lyle T. and Foley J. : B. J. O. : Aug. 1955 : 39-8: 474-87.

peripheral suppression could be demonstrated in all cases in which normal retinal correspondence was present.

116. Suppression in Strabismus

Virtual suppression, under binocular conditions of strabismus, may be demonstrated for similar contours, but not necessarily for other components of vision.

There is a latent period of suppression in strabismus which may be used to advantage in the examination and determination of relative localization with either similar or dissimilar amblyoscope targets.

The results of the usual clinical tests to determine the presence or absence of suppression in strabismus are often confusing and superfluous.

Suppression in strabismus exists only under the precise conditions of usual, every day visual situations. One may demonstrate a region of suppression confined to the nasal retina in the esotropia, and to the temporal retina in exotropia, bounded by a vertical line through and including the macula, on one side, and the "Zero measure point" (*Deckstelle*), on the other side. Within this region there may be relative or complete suppression, obscuration, confused or lost relative localization, mislocalization, or displacement.

Qualitative differences exist between esotropia and exotropia with regard to the regional sensorial anomalies described, but are independent of the presenee or absence of anomalous retinal correspondence.

Anomalous retinal correspondence is probably one of the characteristics of the suppression phenomenon. When suppression is established early in the strabismic patient, anomalous retinal correspondence may or may not follow in its wake.

SYSTEMIC DISEASES

117. Chiasmal Disease

Gliomas of the chiasm represent but about 0·84% of all verified intracranial tumors. In spite of their relative rarity the diagnosis is not difficult if certain salient features are kept in mind.

Ninety per cent of chiasmal or optic nerve gliomas (they represent essentially the same tumour) occur within the first two

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[116] Jampolsky A. : Arch. Ophth. : Nov. 1955 : 54-5 : 683-96.
[117] Wendland J. P. : Arch. Ophth. : July 1955 : 54-1 : 13-21.

decades of life. As Verhoeff has pointed out, they are essentially congential in origin. Visual acuity is affected early in the course of the disease, owing to replacement of the nerve fibers by a neuroglia syncytium. Since Davis' classic monograph on association of glioma of the optic nerve and chiasm with other evidences of Recklinghausen's disease in the patient or members of his family the finding of this evidence in a patient suspected of glioma is of great help in the diagnosis. In at least 37% of patients with optic nerve gliomas, other manifestations of Recklinghausen's disease will be found, and approximately 30% of patients with chiasmal gliomas are said to show other evidence of Recklinghausen's disease. If extremely careful evaluation of the patient for other signs of Recklinghausen's disease were carried out, the percentage would probably be much greater. As Davis has pointed out in 15 consecutive cases of optic nerve glioma, in every case he has observed other evidence of Recklinghausen's disease. Cafe′ au lait spots are the most typical manifestation.

In chiasmal gliomas the X-ray reveals bilateral enlargement of the optic foramina. Proptosis is usually not present in a chiasmal glioma. Gliomas of the optic nerve may or may not present proptosis.

Treatment of chiasmal glioma is unsatisfactory. Fortunately many gliomas seem self-limiting. Surgery was undertaken in the author's patient in the hope that some pedunculated extensions could be removed, and also to decompress the optic foramen. This patient is of interest because she presented the classic findings, of the relatively rare condition of chiasmal glioma and because of the occurrence of massive hemangioma in her sister.

The cases presented illustrate briefly a few of the protean manifestations of chiasmal disease. Emphasis has been placed upon certain features of each case in the diagnosis and classification of chiasmal disease.

118. Systemic Cystinosis — Ocular Changes

Cystinosis,or the Lignac-Fanconi syndrome, is a disease of childhood that is characterized by dwarfism and by the accumulation of cystine crystals within many tissues of the body. Investigation reveals a generalized aminoaciduria and renal tubular dysfunction

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[118] Gogan D. G. et al : Arch. Ophth. : Jan. 1956 : 55-1 : 36-41.

which is usually manifest by acidosis, hypokalemia, and impaired water reabsorption. Renal rickets and uremia are frequent late sequelae.

While the disturbance is believed to be a hereditary defect in the utilization of many amino-acids, cystine precipitates out presumably because of its low solubility. The condition is not to be confused with the relatively benign cystinuria which appears to result from a lowered renal thereshold (for cystine, lysine, and arginine) and which does not reflect a general disturbance of amino-acid metabolism, such as is the case with the cystinosis of children.

The ophthalmologic importance of cystinosis is due to the fact that the crystals of cystine can be frequently seen in the cornea, and occasionally in the conjunctiva, and have such a characteristic appearance and distribution as to be pathognomonic of the condition. The ophthalmologic significance is perhaps heightened by the fact that the opacities, although definite and characteristic, can be easily overlooked unless the eyes are examined closely with good illumination and sufficient magnification.

The biomicroscopic findings in the cornea are pathognomonic of the disease. In no other condition is there the uniform deposition of scintillating particles situated preferentially beneath the anterior surface (and, to a less extent, in preriphery). So characteristic are these findings that biopsy studies would seem to be unnecessary for the diagnosis.

While unequivocal and striking with biomicroscopy, the corneal opacities are so inconspicuous by gross examination as to be readily overlooked.

The authors have no firm hypothesis to account for the preferred localization of the crystals in relation to the surfaces of the cornea. One possibility is that these regions, representing the sites where water is selectively removed, induce a local supersaturation and consequent precipitation of the cystine. Such an explanation has previously been suggested to account for the localization of band keratopathy with hypercalcemia. Another possibility, without as yet, any foundation in fact, is that the oxidation- reduction potential of the cornea in these regions is such as to maintain the cystine in an oxidized, and therefore relatively insoluble, form.

In the conjunctiva the crystals are aggregated preferentially, but not exclusively, in the walls of the blood vessels. This suggests a participation of the reticuloendothelial system but does not necessarily indicate phagocytosis.

119. Virus of Behcet's Disease.

Behcet was the first to describe in 1937, a morbid entity presenting three symptoms, namely, iridocyclitis with hypopyon, aphthous lesions in the mouth, and ulcerations on the genitalia. However since 1898, other investigators had observed the same manifestations, but it was Behcet who first reported that these symptoms are the basic manifestations of an independent disease and, therefore, this new syndrome was referred to as Behcet's disease both in Europe and America.

1. All patients with Behcet's disease had had an illness of the joints similar to polyarticular rheumatism.

2. The disease can be diagnosed and the virus can be isolated from the blood of patients who have aphthae in their mouth and on their genital organs but in whom the eye manifestations have not yet appeared.

3. Observation of the disease in three brothers indicates that it is communicable.

4. Viremia is present in the patients and its degreee may be correlated with the clinical manifestations of the disease.

5. As the degree of viremia increases in the blood, the titrate of the complement-fixation reaction decreases; on the contrary, as the degree of viremia decreases, the titrate of the complement-fixation reaction increases.

6. The virus is excreted in urine and is thus eliminated from the circulatory system.

7. Cortisone treatment is contraindicated, since it increases the clinical manifestations and decreases the titrate of antibodies in the blood.

120. Ocular Diseases Caused by Nematodes.

1. Allergy has been attributed to nematodes and a "tropical phlycten" was suggested by Sorsby in 1942, but no reference appears in the literature connecting the allergic manifestation in phlyctenulosis with allergic symptoms produced by nematodes.

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[119] Sezer N. : A. J. O. : Jan. 1956 : 41-1 : 41-55.

[120] Jeffery M. P. : A. J. O. : July 1955 : 40-1 : 42-53.

2. The possibility of such a connection was suggested by a case of phlyctenulosis that cleared spectacularly in a couple of days after worm treatment, though the phlyctenules had been recurring for two years previous to this. The patient then remained free from eye symptoms for four years, only to have another attack of phlyctenules with another roundworm infestation.

3. From 1945 to 1947, a study of 1,217 cases was made to determine the incidence of nematode infestation associated with eye disease.

4. A further study of 494 cases of eye disease with positive stool tests made it possible to classify the types of eye diseases which occurred with hookworm, roundworm, and histolytica, also known to produce pathologic conditions of the eye and the most common type of dysentery found on the Nilgiris, India, where this study was conducted.

As a result of this classification, it was found that the phlyctenular keratoconjunctivitis headed the list as the complicating eye disease both with nematodes and with amoebiasis. It was present in two thirds of all these cases. The ocular complications involved not only the superficial eye structures but less often the eyeball itself.

5. From a study of the eosinophilia, the following conclusions could be drawn :

(a) The group negative for both worms and eye complications had the lowest maximum eosinophil count of any group.

(b) The group with eye disease plus hookworms plus roundworms had the highest single maximum eosinophil count.

(c) Hookworm was much less prevalent than roundworm on the Nilgiris, but eyes in patients infested with hookworm showed more moderate, more evenly distributed eosinophilia. Although in no cases of hookworm were eosinophils absent, the maximum range was from 10 to 13 per cent; its maximum count was 22 per cent. On the other hand, there were 105 cases of roundworm out of 182 cases showing less than seven per cent eosinophilia, 15 of the 182 cases had no eosinophils at all or less than one per cent. The maximum single count, in the study was 28 per cent eosinophilia.

(d) These facts suggest that hookworm is a more constant factor in the production of allergic symptoms, perhaps due to the greater tissue destruction as it burrows its way through the skin of the feet and migrates through the lungs, blood, lymphatics, liver, and so forth and then anchors itself to the wall of the intestines. Roundworm is content to be a transient occupant of the lumen of the bowel and feed off the food ingested instead of the blood of the human host which is the food of hookworm. Roundworm may produce severe allergic manifestations or, more often, none at all; in many cases, the eye manifestations were the only symptoms of allergy, even in the absence of eosinophils.

6. Moro or Mantoux tuberculin tests in cases of phlyctenulosis showed delayed healing of the eyes in the majority of of tuberculin-positive cases, even after the worms were treated, in contrast to quick healing if the phlyctenules were due to nematodes alone.

Results in the groups of negative and in complete tuberculin-tested patients were naturally unreliable. It was impossible to be sure in the unhealed negative tuberculin cases whether they would have proven to be positive had the patients all come back for the final stronger inoculations of tuberculin. It should be emphasized, however, that in the first large series of cases studied, most of the phlyctenulosis cases cleared promptly when treated for worms and only recurred at those times when the patients were again found to be positive for worms.

121. Ophthalmologic Changes in Pituitary Tumors.

The three most frequent ophthalmologic changes found in pituitary tumors and craniopharyngiomas are visual field defects (some form of bitemporal and hemianopsia), optic atrophy, and loss of central visual acuity. Since optic atrophy and loss of central visual acuity are dependent upon and shown in the field defect, and since 96 per cent of the cases of pituitary tumor and craniopharyngioma show such defect, the visual field examination may be said to be the most important single ophthalmologic criterion for evidence of such tumors.

122. Ocular Sarcoidosis.

The appearances of the eye changes may be suggestive of sarcoidosis, but no eye signs are characteristic enough to be

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121 Chamlin M. et. al. : A. J. O. : Sept. 1955 : 40-3 : 353-68.

122 Ainslie D. and James D. G. : B. M. J. : April 28, 1956 : 955-57.

diagnostic in themselves. Other clinical and radiological features found elsewhere in the body may provide strong support for the diagnosis. In the present state of our knowledge, however, histological proof of the presence of sarcoid tissue provides the most satisfactory confirmatory evidence. When skin lesions or enlarged superficial lymph nodes are present, biopsy may be easily performed. In the series reported eight skin biopsies and seven lymph-node biopsies revealed sarcoid tissue. Other sites from which material containing sarcoid tissue was obtained were tonsil (1), soft palate (1), excised eye (1), and hilar glands necropsy (1). Alternatively, tissue for histological examination may be obtained by aspiration liver biopsy, but the process is not entirely without danger, and, furthermore, it is not always possible by this method to distinguish between sarcoidosis and tuberculosis. A positive liver biopsy was observed in four instances in this series.

Kweim Test : This consists of intradermal injections of a saline emulsion prepared from sarcoid tissue. In patients with active sarcoidosis a dusky-red nodule develops at the site of injection during the ensuing three to four weeks. Histological examination of the nodule reveals characteristic, sarcoid tissue when the test is positive. In the absence of easily accessible lesions for biopsy, the Kweim test is a simple, safe, and specific outpatient technique for providing histological evidence of active sarcoidosis. It was performed in 19 of the authors' patients with ocular sarcoidosis and was positive in 15. This rate of 79% is similar to that found in all types of sarcoidosis. In 10 of the 15 positive cases, corroborative histological evidence of sarcoidosis was obtained by other biopsies — skin(5), lymph node (3), and liver (2). It has been suggested that conjunctival biopsy may reveal sarcoid tissue in patients with sarcoidosis. Conjunctival biopsy was performed in five cases but in no instance was sarcoid tissue found. In none of these cases, however, was there any microscopic evidence of conjunctival sarcoidosis, the biopsies being taken from the apparently normal conjunctiva of the lower fornix. Healing after the biopsy was rapid and complete in all cases.

Of 100 patients with histological evidence of sarcoidosis 28 had ocular abnoramlities. Iridocyclitis, the most serious manifestation, was present in 20 cases.

If untreated, sarcoid iridocyclitis may lead to blindness.

Early treatment of the iridocyclitis with cortisone or hydrocortisone offers the best chance of controlling the disease.

Treatment is unlikely to be beneficial when started at a late stage. Early diagnosis is therefore essential.

123. Spherophakia-Brachymorphia Syndrome.

Five new cases of the spherophakia-brachymorphia syndrome are described. Four cases occurred in one family. In addition to the usual findings of spherophakia, micro-phakia, index myopia, ectopia lentis, secondary glaucoma, brachydactyly, short stature, and small span index, study of the two families revealed larger *atd* angles in patients with the full syndrome. In the two families reported the disease was manifested as an autosomal recessive, with partial development of the syndrome in heterozygous carriers.

Galucoma usually develops as a result of pupillary block, or may result from dislocation of the lens. Early treatment by iridectomy or iridectomy and extraction of the lens may prevent serious visual loss.

124. Congenital Toxoplasmosis.

Human toxoplasmosis has been recognized since 1939.

There are two types of chronic infection—congenital and acquired. Congenital infection is by far the more common, its cardinal features being hydrocephalus, chorioretinitis, and cerebral calcification. The most characteristic radiological appearances are curvilinear streaks in the region of basal ganglia or the optic thalamus, or rounded deposits in the same regions.

The mode of transmission in the congenital type of infection can only be surmised.

The mother contracts the primary infection and develops primary parasitaemia during pregnancy. The mother of an infected child seldom complains of any suspicious illness during pregnancy. It is significant that only the first child in the two families reported is infected. The second child shows no evidence of disease. Either the parasitaemia is transitory during pregnancy or

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[123] Rosenthal J. W. and Kloepfber H. W. : Arch. Ophth. : Jan. 1956 : 55-1. : 28-35.

[124] Mehta K. H. : B. J. O. : Sept. 1955 : 39-9 : 569-71.

neutralizing antibodies are quickly formed in the maternal blood so that further calamity is avoided. This explains why subclinical infection is widespread though congenital infection is relatively rare. One is justified in reassuring the mother that there is no danger of infection in any subsequent pregnancies.

125. Ocular Sequelae of Tuberculous Meningitis.

Dr. Frank Walsh in his clinical Neuro-Ophthalmology, published in the United States in October 1947, when discussing tuberculous meningitis, stated that :

1. " A vast majority of patients die from the disease but a few well-authenticated recoveries have been recorded — there is no effective treatment.

2. " Papilledema if it occurs at all in these cases does so rarely.

3. " Miliary tubercles of the choroid are frequently observed a short time before death. It is rare that an individual with chorioidal tubercles recovers.

4. "Atrophy of the optic nerve is rarely if ever seen, since there is insufficient time for atrophy to develop before death occurs."

Thanks to modern therapy—Streptomycin, P. A. S. and I. N. H. — the survival rate is now about 80 per cent and, as a result of this, eye complications which were practically unknown seven years ago are now a frequent occurence.

Papilledema, chorioidal tubercles, and optic atrophy form the majority of the eye complications Ocular palsies are not uncommon but for some reason they generally clear up and are not amenable to neurosurgery in the ordinary way.

The presence of choroidal tubercles can, therefore, be taken as evidence of miliary tuberculosis and consequently they are of diagnostic value. They are sometimes difficult to see and they present as small slightly faded and stippled areas in the posterior half of the uveal tract, chiefly in the temporal half of the fundus.

They are a valuable supporting prognostic guide; new tubercles appear when the disease is active and with the disappearance of the pyrexia no fresh tubercles appear. Incidentally, many of the small tubercles disappear completely without leaving any ophthal-

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[125] Mooney A. J. : A. J. O. : May 1956 : 41-5 : 753-68.

moscopic evidence of their presence. Others leave small rounded pale areas with pigmented borders, and their only importance from the neurosurgical aspect is that, if they are increasing in number, neurosurgery might be contraindicated. Moreover in this stage the use of cortisone or ACTH might be contraindicated on account of the probable presence of the active pulmonary lesions, although there is not general agreement on this point, when the patient is getting streptomycin and INH.

Papilledema was present in 17 cases in the reported series or 26%. In some of these cases the edema was confined to the upper and lower disc margins and subsequently disappeared as the disease regressed.

THERAPEUTICS

126. Carbachol Injections in Eclipse Blindness.

After assessing the extent of functional damage and recording the ophthalmoscopic appearance a retrobulbar injection of carbachol, 0·25 mg., was given to one eye only. If there was no definite improvement on one of the previously described tests (Jaeger's types were generally used) the patient was classified as not responding to treatment. All responding patients were given daily treatment for two to three days.

Carbachol caused no serious side-effects. It occasionally gave rise to excessive sweating, salivation, and slight nausea, or to diplopia and pain and throbbing in the head. Some patients developed blurred vision (even to less than 6/60). Ophthalmoscopically, oedema of the retina was found. All disturbances were transient.

In many instances in the present series, even in comparatively late cases, it was shown that symptoms of sun-blindness could be alleviated immediately by retrobulbar injections of carbachol.

127. Carbazochrome in Primary Glaucoma and Diabetic Ratinopathy.

Forty three primary glaucoma, diabetic retinopathy, and control patients, carefully screened from the white population of eye patients in this area, have been studied for correlation of capillary

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[126] Gebertt S. : B. M. J. : Jan. 14, 1956 : 95.

[127] Keeney, A. H. and Mody M. V. : Arch. Ophth. : Nov. 1955 : 54-5 : 665-69.

function with their ocular disease. Alternate members of these groups have also been treated with carbazochrome (Adrenosem) or identical-appearing placebo tablets.

The control patients showed an average initial lymph flow of 11 mm. in 15 minutes, which is essentially the same as the value in our previously reported control group. A few subjects showed moderate changes in flowvalue under medication, but there was no consistent alteration in either the patients receiving carbazochrome or those receiving placebo tablets. Capillary loop counts varied within the expected normal range and showed no significant reduction following medication except in two patients with low initial counts in the carbazochrome treated group.

All of the 11 primary glaucoma patients had the open-angle type and had low coefficients of facility of aqueous outflow. Average lymphatic flow and capillary loop counts were not influenced by medication. There was a trend for higher (20-30) capillary loop counts to be associated with lower coefficients of facility of aqueous outflow (0·05 — 0·10 cu. mm/min/mm. Hg.) and vice versa. Intraocular tension was not influenced by medication.

The diabetic retinopathy patients all had Grade 1 to 3 fundus changes, and none showed alterations on carbazochrome or placebo medication. Average lymph flow values (8 mm.) were slightly lower than in the control group (11mm.) but generally remained stable and reflected no changes with medication. Capillary loop counts were essentially the same as in the control group and were also uninfluenced by the drugs used.

Under the conditions of this study, carbazochrome could not be demonstrated to have significant effect on intraocular tension, the coefficient of facility of aqueous outflow, diabetic retinopathy, cutaneous lymph flow, capillay counts, or capillary mobilization.

128. Calsulfhydryl in Chemical Injury Of Cornea.

Rat corneas injured with 0·1 N. Sodium hydroxide and treated with calsulfhydryl concentrate remained inflamed longer and healed with more residual opacification than did similar

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[128] Bahn. G. C. and Allen J. H. : Arch. Ophth. : July 1955 : 54-1 : 22-27.

injured untreated eyes. Calsulfhydryl was found to have a deleterious effect under the conditions of the experiment. Both eyes of 15 albino rats were burned with 0·1 N Sodium hydroxide solution. Prior to injury, lid sutures were placed in order that closure could be maintained during the observation period. Immediately following the injury, the right eye was flooded with calsulfhydryl concentrate. The lids were closed and reopened only for examination or treatment. Examinations were made at 24 hour intervals.

Rat corneas burned with 0·1 N Sodium hydroxide and treated with calsulfhydryl concentrate three times daily and lid closure failed to heal as rapidly and completely, as did similarly injured corneas which received only lid closure as treatment. Calsulfhydryl had a significantly deleterious effect upon rat corneas under experimental conditions.

In a series of four experiments in which rat eyes were burned with 0·1 N hydrochloric acid and treated with several forms of calsulfhydryl (Hydrosulphosol), the drug proved to have no beneficial effect. In another series of four experiments in which rats' eyes were burned with 0.1 N sodium hydroxide and treated with several forms of calsulfhydryl, the drug proved to have either no beneficial effect or a definitely deleterious effect. Subsequent reports will include data obtained in experiments employing other burn agents.

129. Treatment of Corneal Infections.

(1) Two clinically typical but bacteriologically unproven cases of pyocyaneus infection of the cornea responded promptly and satisfactorily to local applications of on ointment containing 10,000 units Polymyxin B and 500 units Bacitracin per g.

(2) Eleven rabbit corneas inoculated with Pseudomonas Pyocyaneus responded well to 7 days' treatment with this ointment. The Polymyxin ointment was superior to aureomycin and penicillin.

(3) Frequent applications of the ointment are likely to control pyocyaneus infections of the cornea in man, and ointment should be used as prophylactic in cases of corneal injury, especially those caused by foreign bodies in industry.

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[129] Gurd D. P. : B. J. O. : March 1956 : 40-3 : 159-66.

130. Effect of Cortisone on Wounds.

Experimental work is described in detail, which deals with observations on the effects of locally applied cortisone on the healing of incisions made in rabbit corneas. The tensile strengths of partly healed corneal incisions were measured, comparing treated eyes with control eyes. Photomicrographs were taken to show effects of cortisone on corneal healing. Additional work is described in which an attempt was made to show the intensity of the effects of cortisone given as drops versus cortisone given subconjunctivally.

Topically administered cortisone causes definite inhibition of healing of incisions in the corneas of rabbits, as shown by testing the tensile strengths of the incisions, and by microscopic sections. This inhibition ceases promptly when the cortisone is no longer given. Cortisone administered as drops in the conjunctial sac appears to be as effective as when given by the subconjunctival route.

131. Cyclogyl Re-evaluation

Cyclogyl as a cycloplegic with the best average of no residual accommodation (75 per cent to 90 per cent) in age groups ranging from 5 years to 76 years has been investigated.

2. Cyclogyl seems to arrive at its maximum effect in 30 minutes much the same as homatropine (5·0 per cent) in methylcellulose and Zephiran.

3. The recovery time from cycloplegia is much more rapid with cyclogyl than homatropine. Most patients were able at least to tell the time by wrist watch and actually read the newspaper within three to six hours after counteracting pilocarpine drops (1·0 per cent) were instilled.

4. Postcycloplegic examinations can be done the next day in most cases if necessary.

5. The 1·0 per cent solution of cyclogyl is recommended in all refraction patients up to the age of 40 years. The 0·5 per cent sloution of cyclogyl is recommended in most patients over the age of 40 years.

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[130] Palmerton E. S. : A. J. O. : Sept. 1955 : 40-3 : 344-53.

[131] Rasgorshek R. H. and McIntire W. C. : A. J. O. : July 1955 : 40-1 : 34-37.

6. The 0·5 per cent solution of cyclogyl seems to be a sa mydriatic in elderly patients and is more rapid in its action tha euphthalmine and ephedrine.

132. Acetazoleamide in Glaucoma Surgery.

In a small series of cases of glaucoma surgery it was foun that acetazoleamide (Diamox) administration during the postoperative period is conducive to early restoration of the anterio chamber and to maintenance of a formed chamber. The serie is too small to rule out coincidental spontaneous chamber restoration.

It also appears that the lowered intraocular pressure incident to inhibition of aequous humor secretion by acetazloeamid may lead to mimimal cystic filtration bleb formation in the surgical drainage area. Its use may therefore be inadvisable in thes cases.

There is as yet no definite proved physiological explanatio for the action of acetazoleamide in restoration of the anterio chamber after intraocular surgery.

133. Long-term Acetazoleamide in Glaucomas.

Thirty one (62%) of 50 patients with open-angle glaucoma uncontrolled by miotics were adequately maintained for periods of 6 to 15 months when around-the-clock acetazoleamide (Diamox) was added to their therapy.

Two-thirds of the open-angle glaucoma failures resulted from intolerable side-effects, most prominent of which was inappetence.

Only six patients (12%) of the 50 in the open-angle glaucoma group responded satisfactorily initially to acetazoleamide but failed to maintain controlled intraocular pressures for over six months. Even more infrequent was the development of true resistance to the drug (6%).

Five of 10 patients with uncontrolled chronic secondary glaucoma were successfully regulated on acetazoleamide.

Only 2 to 10 patients with chronic narrow-angle glaucoma could be satisfactorily maintained on acetazoleamide.

It may be concluded that long-term acetazoleamide administration may be added cautiously to the therapeutic regimen of

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[132] Thorpe H. E. : Arch. Ophth : Aug. 1955 : 54-2 : 221-24.

[133] Becker B. and Middleton W. H. : Arch. Ophth. : Aug. 1955 : 54-2 : 187-92.

patients with otherwise uncontrolled glaucoma. However, its use should be restricted to those who can be followed closely and who can be maintained normotensive at tolerated doses of acetazoleamide.

134. Long-term Administration of Diamox.

A group of 29 patients with advanced glaucoma of different types were given long term treatment with Diamox and miotics· Twenty of these were treated an average of ten and a half months with Diamox. Of these, 12 were classed as being under good control, six as under fair control, and two as under poor control. Of the remaining nine, five patients required surgery before the close of the study, two patients developed central scotomas (one with visible macular change) while under Diamox therapy, and two patients discontinued the drug because of shortness of breath and weakness. Two patients developed a late resistance to Diamox treatment.

It is felt that the long term use of Diamox can be a useful adjunct in the treatment of advanced glaucoma. There remains the possibility that significant complications will be revealed by a larger series of patients and by a longer period of treatment.

135. Diamox for Corneal Dystrophy.

The clearing effect of Diamox on the corneal edema in cases of primary and secondary endothelial dystrophy was reported.

Visual acuity could be substantially improved in most of the cases.

Relatively small and infrequent doses were required for the maintenance of visual improvement for indefinite periods.

Side effects were rare and negligible and never necessitated the discontinuation of the drug.

136. Glaucoma Treated with Diamox.

(1) Diamox can exert a powerful effect in lowering intraocular pressure.

(2) It reduces ocular tension in various forms of glaucoma, either alone or in conjunction with other drugs.

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[134] Kupfer, C. et al : A. J. O. : Nov. 1955 : 40-5 (I) : 673-80.

[135] Stocker F. W. : A. J. O. : Feb. 1956 : 41-2 : 203-6.

[136] Drance S. M. : B. J. O. : Nov. 1955 : 39-11 : 659-63.

(3) Diamox seems to be particularly valuable as a method of therapy in cases of secondary and congestive glaucoma.

(4) In chronic simple glaucoma the tension is reduced by Diamox, but only temporarily; further studies in this form of glaucoma are desirable.

(5) Fairly heavy doses of Diamox can be given for long periods without troublesome side-effects.

137. Isoniazid in Ocular Tuberculosis.

As reported in the literature of 1954 and 1955, isoniazid and streptomycin are being used more extensively together as the preferred therapy in tuberculosis. Their synergistic effect is apparently resulting in a smaller number of resistant cases.

Therapeutic trial—In the cases with tuberculin-positive skin tests in which all other tests were negative, combined therapy (isoniazid and streptomycin) was tried for a period of three weeks in order to help establish the diagnosis. Wherever the response was positive, therapy was continued for a minimum of four months. All these cases have received 300 to 400 mg. of isoniazid per day along with 0.5 to 1 gm. of streptomycin twice a week.

Antituberculous drugs plus cortisone. Despit ereports in the literature contraindicating the use of cortisone in any form of tuberculosis, the drug is being tried in conjunction with antituberculous drugs, with promising results. It appears that cortisone, hydrocortisone, and corticotropic hormones may inhibit the inflammatory reaction surrounding the tuberculous lesion, thus making it possible for the antituberculous drugs to attack the tuberculous organisms more rapidly and more effectively.

Clinical cases —In the past year 10 cases of probable ocular tuberculosis have been treated. Three were cases of chorioretinitis treated with isoniazid and streptomycin alone. The other seven were cases of chorioretinitis and iridocyclitis, and all were treated with both antituberculous drugs and cortisone (orally).

Results obtained in the three cases treated by combined antituberculous drugs alone were fair to good. Beginning improvement usually was noted in the third week of therapy. On the contrary, treatment of cases with addition of cortisone generally

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[137] Kratka W. H.: Arch. Ophth.: Sept. 1955 : 54-3 : 330-44.

resulted in good to excellent response, improvement being noted within 7 to 10 days. Therapy was continued for the usual period of four months, although cortisone was gradually eliminated after apparent disappearance of clinical activity.

Results in these cases strongly suggest that the addition of cortisone inhibits the usual local tissue reaction which appears at the site of the tuberculous lesion, thus preventing the subsequent fibroblastic activity and resultant scar tissue formation. Chorioretinal atrophy and pigmentation have been markedly decreased. The clearing of vitreous opacities, as well as the decrease in chorioretinal inflammation proximal to the macula, papillomacular bundle, and disc, has resulted in excellent final visual acuity in these cases.

138. Ophthalmic use of Neosporin.

Neosporin ointment or solution was used in 214 cases of actual or potential external ocular infections. It was successful in most instances of gram-positive infections and in all seven cases of gram-negative infection. Most viral infections encountered improved during the course of therapy. The local reaction rate was 0•5 per cent.

139. Ophthalmic Preservatives-Sterilization.

The rate of germicidal activity of many commonly used chemical preservatives has been found to be inadequate to maintain sterility of an ophthalmic solution against accidental Pseudomonas aeruginosa contamination.

It is postulated that previous authors have based their conclusions on in vitro techniques which were deficient in procedures required to neutralize the entire action of the test preservative. Both the in vivo rabbit corneal results and the in vitro data presented here are in marked disagreement with the earlier reports.

Polymyxin B sulfate (1000 units per cubic centimeter) was shown to be the most rapidly acting chemical preservative tested. A combination of polymyxin B sulfate and benzalkonium chloride 1 : 10,000 appears to possess a broad spectrum and is rapidly bactericidal.

While not having an adequate rate of action for many ophthal-

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[138] Hallett, J. W. : et al. : A. J. O. : May 1956 : 41-5 : 850-53.

[139] Riegelmans., et. al. : Arch. Ophth. : Nov. 1955 : 54-5 : 725-32.

mic uses, chlorobutanol (0·5%) was found to be the second choice as preservative.

The stability of polymyxin B and its combination with benzalkonium chloride was investigated, and the results are reported.

A practical method is presented by which the practicing pharmacist can prepare sterile, rapidly germicidal ophthalmic solutions competitive with, or superior to some of the presently available proprietary products.

140. P_{32} in Ocular Tumors.

A total of 262 cases of ocular pathology in which P_{32} uptake studies were performed are presented. Of these 233 cases had intraocular lesions, while 29 cases had extraocular (adnexal) lesions. The test was modified to include readings 1 hour and 24 hours after injection of the isotope. A new criterion of positivity was established. The test is considered positive when in one hour there is an uptake over 30 % greater than the normal and in 24 hours there is an increase beyond the one-hour calculation. In lid lesions, the above criteria are applicable, but the test is also considered positive if the one-hour calculation is over 100% greater than normal regardless of the 24 hour calculation.

In the 233 cases of intraocular lesion subjected to uptake testing, there were 3 false-positive tests in the group of inflammatory lesions and 3 false-negative tests in the series of 30 cases of intraocular malignant melanoma. In four other cases of intraocular malignant melanoma repeat tests were performed where the clinical diagnosis was obvious and the P_{32} uptake test had been negative. All of the repeat tests were positive. Three of these occurrred in cases where the lesion was posterior to the equator of the globe, while one occurred in a lesion anterior to the equator.

There were five false negative tests in the series of six cases of retinoblastoma.

Of the 29 cases of extraocular (adnexal) lesions there was one false-negative test occurring in a case of basal-cell epithelioma of the eyelid.

On the basis of these studies, and in the light of the experimental work of other investigators, the following conclusions appear valid :

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140 Terner I. S., et al : Arch. Ophth. : Jan. 1956 : 55-1 : 52-83.

1. P_{32} uptake studies are a valuable aid in the differential diagnosis of intraocular pathology, especially in the differentiation of serious and solid detachments of the retina provided that the lesion is within reach of the counter tube.

2. Intraocular malignancy in the posterior segment of the globe beyond the reach of the presently used counter tube gives equivocal results when tested with P_{32}.

3. The P_{32} uptake test gives less accurate results in intraocular cases involving patients with one eye, in cases of bilateral ocular pathology, and in cases in which previous intraocular surgery has created a state of inflammatory reaction.

4. For reasons yet unknown, the P_{32} test as performed in the laboratory is decidedly reduced in accuracy in cases of retinoblastoma.

5. In this study, no correlation could be made between the P_{32} uptake measured in vivo as "per cent greater than normal" and the cellular type of the malignant melanoma studied in vitro following enucleation.

6. In extraocular (adnexal) lesions the results of the test appear to follow a pattern similar to that experienced with intraocular lesions, with the exception of epitheliomas of the eyelids.

7. P_{32} testing prior to surgery in certain adnexal lesions occasionally offers the surgeon an advantage otherwise attainable only by biopsy. In lid lesions the test does not offer as great an advantage.

8. The validity of the P_{32} uptake test depends upon (1) the ability of malignant tissue to concentrate P_{32} (2) the capacity of malignant tumor tissue to retain P_{32} over a period of time, and (3) the faculty of normal tissues to excrete their initial concentration of P_{32} rapidly.

141. Polyfax in Superficial Ocular Infection.

(1) An antibiotic ointment containing bacitracin and polymyxin suitable for ophthalmic use is described.

(2) The range of activity of the ointment covers all pyogenic organisms likely to infect the eye.

(3) Increase in resistance of sensitive organisms to polymyxin and to bacitracin rarely occurs.

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[141] Ainslie, D. : B. J. O. : Sept. 1955 : 39-9 : 557-62.

(4) The ointment is non-irritant when applied to the eyelids and conjunctival sac and no allergic response occurred in any of the cases treated.

(5) It is suggested that antibiotics such as bacitracin and polymyxin should be used for local application wherever possible allowing antibiotics more suitable for systemic therapy to be reserved for this purpose.

(6) The ointment has been found effective in the treatment of blepharitis and corneal ulceration. It also appears to be useful as a prophylactic agent against ocular wound infection.

142. Prednisone and Prednisolone.

The indications for prednisone and prednisolone therapy are the same as those for other steroids — ocular inflammation, edema, and allergy. The contraindications also appear to be the same. Herpes simplex infection is the principal one of these. Herpes zoster is an indication. Prednisone and prednisolone merit trial in conditions where the other steroids and/or corticotropin have failed. Inevitably, some patients will fail to respond to one steroid and will be benefited by another. With the introduction of prednisone and prednisolone, two new compounds are available that may be of value in such situations.

Preliminary evaluation indicates that prednisone and prednisolone are clinically superior to cortisone and hydrocortisone when employed topically in the eye. Systemically, their effect in ocular conditions is much the same as that of cortisone and hydrocortisone but smaller dosages are required. The incidence of important side effects in the reported series of patients was not significantly less than with other steroids.

143. Prednisone and Prednisolone.

Prednisone (Meticorten) and prednisolone (Meticortelone), new synthetic steroids, are introduced in the treatment of various inflammatory ocular conditions. Animal experimentation and clinical observations reveal a rapid potent antiphlogistic activity which appears superior, in most instances, to cortisone and hydrocortisone. Several patients who responded poorly, or not at all,

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142 Gordon D. M. : A. J. O. : April 1946 : 41-4 : 593-600.

143 King J. H. and Weimer J. R. : Arch. Ophth. : Sept. 1955 : 54-1 : 46-54.

to other steroids showed dramatic improvement with prednisone and prednisolone. Toxic effects associated with the systemic use of prednisone are minimal, and small maintenance doses will prevent remissions of many inflammatory ocular diseases. Indications and contraindications are similar to those already determined for cortisone and hydrocortisone. Owing to their rapid potent anti-inflammatory actions and the lack of serious systemic side-effects of prednisone these new corticosteroids may well supersede previously known steroids in ocular therapeutics.

144. Streptokinase-Streptodornase.

1. Forty cases of sloughing hypopyon corneal ulcers were studied; in 20 streptokinase and streptodornase in 4,000 units and 1,000 units per cc. of normal saline were administered as local drops every one to two hours. Erythromycin was used as the drug of choice.
2. Eleven cases not receiving the enzymes were lost.
3. All the cases treated with these agents were saved.
4. With the use of streptokinase and streptodornase the average hypopyon resorption time, the average slough-clearance time and the average healing time were reduced.
5. The therapy had no effect on the density of the scar formed but, in view of the initial hopeless prognosis of the cases, the results are encouraging.
6. The use of these agents in doses described is recommended as a routine in sloughing hypopyon corneal ulcers.

145. Sulfirgamide in External Eye Disease.

Trial in over 300 patients indicates that Sulfirgamide is of definite value in the topical treatment of infections of the outer eye. Its major indications are acute bacterial conjunctivitis, inclusion conjunctivitis, and chronic infections of the eyelids, such as blepharitis, meibomitis, and conjunctivitis, especially of staphylococcal origin.

In general, like other sulfonamides, its results as acute infections were very good. In some instances the responinse w not as striking as that noted from the use of antibiotics, when these are

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[144] Agarwal L. P. and Malik S. R. K. : A. J. O. : May 1956 : 41-5 : 847-50.

[145] Theodore F. H. : A. J. O. : Sept. 1955 : 40-3 : 406-11.

effectual. On the other hand, instances of superiority to previously tried antibiotics were also encountered. In chronic infections its effectiveness and limitations were found to be about the same as the antibiotics now available, and its use offers another valuable means of treatment.

Compared to several other sulfonamides now in general use, its value in bacterial infections, as far as can be determined, is about equal. However, its outstanding effectiveness in two cases of inclusion conjunctivitis suggests that it is superior to them, as well as tetracycline antibiotics, in infections due to chlamydozoaceae and that the drug deserves adequate trial in the treatment of trachoma.

Unfortunately, like every other medicament so far available for ophthalmic use, except possibly iodine, sulfirgamide is of no value in the treatment of infections due to other types of viruses. Like other sulfonamides, it is not recommended for central corneal ulcers, especially those due to Pseudomionas aeruginosa, where specific antibiotics are the drugs of choice.

The relatively low incidence of allergy and irritation as compared to other sulfonamides and antibiotics is a point in favor of its use in all infections for which it is indicated. In prophylactic treatment of ocular injuries, it appears to be valuable as well as safe, and clinically, does not seem to delay healing.

146. Sympathomimetic Amines in Glaucoma.

1. The reduction of ocular tension effected by *l*—adrenalin in open-angle glaucoma is due to a lessened producion of aqueous and not to any increased facility of drainage.

2. The reduction of ocular tension by noradrenalin is less than that achieved by *l*—adrenalin, and the action of *d*—adrenalin and adrenalone is practically nil.

3. Aleudrine, though not a vasoconstrictor, acts like *l*—adrenalin in reducing ocular tension. Since aleudrine also induces no mydriasis it may be eventually of some value in narrow-angle glaucoma, but the drug has the great disadvantage of provoking tachycardia.

4. The advantages accruing from the simultaneous use of

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[146] Weekers R., et al : A. J. O. : Nov. 1955 : 40-5-(I) : 666-72.

remedies facilitating aqueous drainage and reducing aqueous formation are emphasized.

147. Tetracycline in Trachoma.

So far three antibiotics of the tetracycline group have been made available for therapeutic purposes. Oxytetracycline and chlortetracycline have been used in the treatment of trachoma with varying degrees of success (oxytetracycline 24 per cent; chlortetracycline 40 per cent.)

It has also been observed that the trachoma virus shows a variable response to various therapeutic agents. Some authors have found the tetracycline group quite effective (Mitsui and Tanaka, 1951), and others (Shah, 1951; Siniscal, 1952) were disappointed at the results. In the authors' hands these drugs have not given a very encouraging response.

After using pure tetracycline, Mitsui and others (1955) reported 78 per cent cure and 13 per cent improvement. Similar results were obtained by Tsutsui (1955), who even asserts that a 100 per cent response car be obtained in acute cases of trachoma. The authors' results however do not allow them to share this optimism. The response to tetracycline indicates that it is an effective agent against the trachoma virus in about 40 per cent of cases as shown by disappearance of inclusion bodies from the smear. Like erythromycine it seems to be a quick acting drug, for in about 30 per cent of their cases inclusion bodies were absent from the smear in the 3rd week, and the secondary infection cleared in a very short time. The subjective symptoms also showed a uniform response and pannus retrogressed in all cases which seemed to be cured. The drug seems to be of special value in trachomatous Kertitis, as the disappearance of corneal lesions only takes about 2 weeks. In a few cases, when cure was not obtained, the pannus retrogressed considerably but not completely. This suggests that the formation of pannus, though primarily a manifestation of trachoma, is accentuated by some secondary infection, and that the clearance of this secondary infection by tetracycline is responsible for its retrogression. The effect of the drug in these cases may have been rather slow, and the results might have been better if the treatment

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147 Agarwal L. P. and Malik S. R. K. : B. J. O. : Dec. 1955 : 39-12: 759-61.

had been prolonged. Tetracycline, does not compare favourably with sulphonamide, but may be worth trying in sulphonamide-resistant cases.

(1) The study of one hundred cases was controlled by the demonstration of inclusion bodies by conjunctival scraping at intervals of 3 weeks.

(2) Tetracycline was found to be quick acting and effective in 40 per cent of cases.

(3) Oral therapy (32 to 40 capsules of 250 mg.) combined with local ointment of one per cent is recommended.

148. Tetracycline and Chloramphenicol.

Tetracycline (Achromycin), a new broad-spectrum antibiotic which is chemically related to chlortetracycline (Aureomycin) and oxytetracycline (Terramycin), was utilized in a series of experiments designed to test the efficiency with which this antibiotic penetrates into the aqueous humor of rabbit and human eyes, following systemic and local administration. For comparative purposes, and also to test its penetrability into human eyes, chloramphenicol (Chloromycetin) was administered per os and subconjunctivally to a group of human patients.

It was noted that the bacterial spectrum of tetracycline is the same as that of chlortertracycline and oxytetracycline and is similar to that of chloramphenicol. Also, it was remarked that a bacterial cross resistance has been found among the terracycline analogues, but none between any of them and chloramphenicol.

Observation on rabbit eyes. 1. Intra-peritoneal tetracycline was absorbed into the blood stream and passed through the blood-aqueous barrier quite well.

2. With reference to penetrability (into the aqueous humor from the plasma), tetracycline was superior to its analogues (chlortetracycline and oxytetracycline), but inferior to chloramphenicol.

3. The concentration of tetracycline in the aqueous humor increased each time the anterior chamber was re-formed, so that the average secondary aqueous humor level was higher than the primary and the tertiary aqueous humor level was the highest of all.

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[148] Abraham R. K. and Burnett H. H. : **Arch. Ophth. : Nov. 1955 : 54-5 : 641-59.**

4. Tetracycline, administered subconjunctivally, penetrated into the aqueous humor, but was highly irritating to the eyes at the site of the injection.

5. The addition of epinephrine to the subconjunctival tetracycline did not prolong its presence in the aqueous humor beyond that found when tetracycline was given alone (six hours). The epinephrine did decrease the inflammatory reaction to tetracycline, but only for the first two hours after the injection.

6. When the combination of tetracycline and hyaluronidase was injected subconjunctivally, there was a marked decrease in the inflammatory reaction throughout the length of the experiment, and these eyes recovered their normal appearance more quickly than when tetracycline was given alone.

Observation on Human Eyes. Tetracycline per os resulted in good plasma levels of this antibiotic. The levels varied according to the dosage schedule followed.

Tetracycline administered as a continuous intravenous infusion resulted in high plasma levels.

Tetracycline penetrated quite well from the plasma into the primary aqueous humor. As in the rabbits, an increasingly higher percentage of the antibiotic was found in the aqueous humor each time the anterior chamber re-formed, so that the tertiary aqueous humor had the highest concentration of all.

Following the systemic administration of tetracycline (in humans), the percentage of this antibiotic which penetrated into the aqueous humor was greater than that reported from chlortetracycline (in humans).

There was a very low incidence of toxic reactions following tetracycline per os. Also, the incidence was lower than that reported for chlortetracycline and oxytetracycline.

Some of the patients who received tetracycline intravenously developed thrombi in the vein used for the infusion.

Chloramphenicol per os produced good plasma levels of this antibiotic, which then passed into the aqueous humor very well.

The aqueous humor-plasma ratios of chloramphenicol were higher than those found for tetracycline following the oral administration of these two antibiotics.

ROJA MUTHIAH
47, HOSPITAL STREET
KOTTAIYUR-623 106

Oral dosage schedules for tetracycline and chloramphenicol are suggested. These are based upon the minimum inhibiting concentrations of these antibiotics for most micro-organisms, the ability of tetracycline and chloramphenicol to penetrate into the aqueous humor of humans, and the plasma levels obtained when various oral dosage schedules are followed.

Intravenous dosage schedules for tetracycline are presented.

Tetracycline drops, in the concentration used, were well tolerated but penetrated very poorly, if at all, into the eyes tested.

Tetracycline, injected subconjunctivally, penetrated very poorly into the normal human eyes tested.

Chloramphenicol, injected subconjunctivally, resulted in fair levels of this antibiotic in the aqueous humor.

Both tetracycline and chloramphenicol were in general, highly irritating to the eyes utilized for the subconjunctival infections. However, the chloramphenicol caused a slightly milder reaction than did the tetracycline.

Because of the possibility of a depression of the bone marrow being associated with the use of chloramphenicol, and in spite of the fact that this drug appears to penetrate into the aqueous humor (of rabbits and humans) better than tetracycline, it is suggested that chloramphenicol be used only when one is combating an intraocular infection that is resistant to tetracycline and the other penetrating antibiotic and chemo-therapeutic agents. One may then conclude that, among the broad-spectrum antibiotics, tetracycline is the drug of choice in ophthalmology when one wishes to use an antibiotic prophylactically or to combat an unidentified organism, or one which is known to be sensitive to this antibiotic.

UVEAL TRACT

149. Serous Choroidal Detachment Dynamics.

A brief review of the literature on the subject of serous choroidal detachment is presented. In the past, it has been the consensus that hypotony (probably from a leaking corneal wound) was the prime etiologic factor in the production of these detachments. It is suggested by these studies that surgical trauma is an

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[149] Chapper S. A. and Leopold, I. H. : Arch. Ophth. : Jan. 1956 : 55-1 : 101-13.

equally important factor and that both trauma and hypotony are necessary in order for this complication to occur. With this in mind, histologic section through normal rabbit eyes were studied as a base line for comparison. Three experiments were conducted to show the effects of (1) hypotony, (2) scleral trauma, and (3) a combination of scleral trauma and hypotony. None of the normal eyes showed histologic evidence of serous choroidal detachment, nor did any of the eyes subjected to trauma alone exhibit this condition. Only 5% of the eyes made hypotonic showed histologic evidence of detachment. Of the eyes subjected to both scleral trauma and hypotony, 37·5% showed ophthalmoscopic evidence and 82·6% showed histologic confirmation of serous choroidal detachment. The area of greatest surgical trauma seemed to localize the region in which the detachments occurred. In this series of experiments it was found that 95% of the serous choroidal detachments occurred in the region of the surgical trauma.

A theory is proposed to explain the physiologic basis for serous choroidal detachment. By showing how the above experiments altered the normal pressure relationships within the choroid (intracapillary blood pressure, intraocular pressure, and oncotic pressure), a logical explanation could be given for the combination of hypotony and scleral trauma, and not either alone, as a cause of serous choroidal detachment.

1. Both surgical trauma and hypotony are prerequisites for the experimental production of serous choroidal detachment following intraocular surgery.

2. Experimental serous choroidal detachment does not seem to occur in the presence of surgical trauma alone or hypotony alone.

3 Surgical trauma appears to have a localizing influence on the site in which serous choroidal detachment will occur.

150. Atrophy of the Iris.

Six cases are reported of a syndrome of atrophy of the stroma of the iris, corneal dystrophy with edema, peripheral anterior synechias, and glaucoma. There were two men and four women with ages ranging from 36 to 49 years. The disease is unilateral in all cases.

150 Chandler P. A. : A. J. O. : April 1956 : 41-4 : 607-15.

2. A prominent feature and a presenting symptom in all but one early case was edema of the cornea, which occurred with normal or only slightly increased intraocular pressure. All cases showed unilateral dystrophy of the posterior corneal surface.

3. An early filtering operation would appear to be indicated both from the standpoint of the corneal edema and the glaucoma.

151. Tuberculin Reaction in Uveitis.

The percentages of positive reactors to PPD, grouped according to 10 years age groups and color, in a series of 499 patients with endogenous uveitis were compared with the corresponding percentages of positive reactors in a control group of 197 patients without inflammatory disease of the uveal tract.

The results demonstrate that the uveitis population did not show a higher than normal percentage of positive reactors to tuberculin.

This strongly suggests that tuberculosis cannot be an etiologic factor in a significantly large percentage of cases of endogenous uveitis.

152. Aetiology of Uveitis

(1) The laboratory findings in a series of two hundred cases of uveitis have been studied and an attempt has been made to relate the results to the anatomical site of the lesion, e.g. anterior, posterior, or pan-uveitis.

(2) The main positive findings were these :

(*a*) There was a higher incidence of anterior uveitis in females and an earlier onset of posterior uveitis in males.

(*b*) High cutaneous sensitivity to tuberculo-protein appeared to be more frequent in patients with anterior uveitis than in those with posterior uveitis.

(*c*) Comparison of the serological findings in uveitis with the findings in control groups showed a striking association between toxoplasma infection and posterior uveitis, and between raised antistreptolysin titres and anterior uveitis.

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[151] Hanno H. A. and Sapeth P. G. : A. J. O. : Nov. 1955 : 40-5-(I) : 647-50.

[152] Smith C. and Ashton N. : B. J. O. : Sept. 1955 : 39-9 : 545-56.

(3) The chief negative findings were these :

(*a*) Apart from eosinophilia, as a possible indication of toxoplasmosis, the blood counts gave little information of value.

(*b*) In the authors' hands the Middlebrook-Dubos tests proved of no diagnostic assistance, and the Mantoux tests, apart from excluding tuberculosis in the younger age groups and in demonstrating allergy to tuberculo-protein in cases of sarcoidosis, were of little use.

(*c*) No case in the whole series could be attributed to syphilis, gonorrhoea, or brucellosis.

(4) The findings are discussed and it is pointed out that, while the laboratory investigations employed were of very limited value in establishing a pathological diagnosis in individual cases, and the possible roles of causative agents, such as toxoplasma and streptococci, became evident when the findings were considered as a whole and compared with control groups of cases without uveitis.

153. Uveitis.

(1) Three associational groupings in uveitis are described, and the author's cases are classified accordingly into four groups:

(A) Systemic disease of the collagenous or rheumatic type.

(B) Local (ocular) viral infection.

(C) Systemic and ocular granulomatous disease.

(D) Other cases.

(2) Investigational analysis shows :

(*a*) A tendency for Group C cases to affect both eyes, but for Group B cases only one. Groups A and D being intermediate.

(*b*) No significant sex distribution,.

(*c*) A single significant age variation in the relative youthfulness of Group C cases. The rarity of uveitis in children is confirmed.

(*d*) Erythrocyte sedimentation rates lower in Group B than in Groups A or C.

(*e*) Incidence of local infection resembling that in the general population. Eye condition not affected by surgical or antibiotic treatment of focal infection.

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[153] Bennett G. : B. J. O. : Dec. 1955 : 39-12 : 727-42.

(*f*) No variation in frequency of attacks for any group with the season of the year.

(*g*) Recurrence rates high in all groups.

(*h*) Secondary glaucoma more frequent in Group B.

(*i*) Of other associations, myxoedema, certain urinary and coryzal infections, and certain dermatoses, perhaps unduly frequent. Positive Wassermann reaction, tonsillitis, and abnormal blood picture rare.

(*j*) Old tuberculin of no value in treatment.

(*k*) Duration of attacks greater in Group C than in Groups A or B.

(*l*) Duration of activity of uvietis in any one group or in the whole series not significantly affected by cortisone.

(3) It is felt that this analysis to some extent confirms the validity of the nosology described, and suggests a basis for the organismal aetiology of uveitis. It indicates the worthlessness of much expensive clincial investigation of patients and of their therapeusis, and urges that greater attention be paid to old-fashioned history-taking and clinical study of the patient as a whole.

VITREOUS

154. Appearance of Vitreous.

1. A series of 508 eyes were examined in the annual eye clinics at Shikarpur and Khairpur, Sindh, in 1951, 1953, and 1954, in order to determine the degree of disturbance to the vitreous surface after intracapsular cataract extractions by the forceps delivery and modified Smith methods.

2. The integrity of the aphakic vitreous surface affords a good criterion by which the two methods may be compared as regards their anatomic results, other things being equal.

3. A short comparison of the other features of the two types of operation is presented.

4. The patients in this series were operated upon both by beginners and by experienced surgeons. More Smith operations were done by beginners than forceps deliveries, and conversely more forceps deliveries, were done by those more expert. Thus

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154 Holland R. W. B. : A. J. O. : Dec. 1955 : 40-6 : 862-70.

a relatively fair comparison could be obtained with a slight bias in favour of the forceps deliveries.

5. There was found no significant difference in the appearance of the vitreous surface after either the Smith or forceps delivery. The modified Smith method, appears to be slightly safer and less damaging to the vitreous both for the beginner and for the more expeienced surgeon.

X-RAYS, RADIATION etc.

155. Biologic Effects of Microwaves.

Opacities can be produced in the eyes of anesthetized rabbits by single exposures to 12·3 cm. microwaves. Time and power requirements for experimental opacity formation ranges between 5 minutes, at 0·59 watt/sq. cm., and 90 minutes, at 0·29 watt/sq. cm. The power densities of this threshold correspond to a thermal flux of 8·4. to 4·1 cal./sq. cm./min. The trend of the threshold beyond 90 minutes is bracketed between 0·22 and 0.12 watt/sq. cm. for 4.5 hours of sustained irradiation. The failure of the protracted period of exposure at 0·12 watt/sq. cm. to cause any discernible effect suggerts the proximity of a power density below which opacity production by this method is not practical.

As nearly as can be determined by ophthalmoscopic examination all opacities are formed in the posterior lens segment and in some respects resemble lesions produced by certain ionizing irradiations. The quantity of 12·3 cm. radition reflected and transmitted by the eye is unknown, but sufficient energy is absorbed to produce temperatures of 49 to 53° C at the site of the lens which later becomes cataractous. A latent period of 1 to 14 days elapses before the onset of discernible opacities. The lesions, in order of increasing severity, are classified according to appearance as minimal, circumscribed, and diffuse. Minimal lesions may not be detrimental to sight, but the last two types interfere with vision. Other ocular effects are observed but, for the most part, appear less significant than lens injury. Secondary effects are not consistently related to the development of lens damage except in some cases of the diffuse lesion, where severe and persisting periorbital edema appears to be a precursor of cataract formation.

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[155] Williams D. B., et. al. : Arch. Ophth. : Dec. 1955 : 54-6 : 863-74.

Increases in body temperature are characteristic of exposure causing opacities. Despite the lower-power levels involved, higher body temperatures are associated with the longer periods of exposure. The indications are that the opacity threshold is partially a function of changes in body temperature and/or evironmental factors that would affect the capability of the body for dissipating heat. The equivalent of the experimental threshold is not known in terms of human analogy. Consideration is being given the development of an opacity threshold in the monkey as an approach to the problem of extrapolation to man. It is suggested in the interim, however, that the present threshold should be regarded as dangerous for human eyes until more definite information is available. Limited evidence of opacity production as a cumulative effect from multiple subthreshold exposures emphasizes the need to explore further this aspect of ocular irradiation.

156 High Voltage Radiation Effects on Eye.

A study of the clinical and histologic effects of irradiating the rabbit eye with 16-19 mev electrons and 23 mev x-rays by means of the betatron for a wide dosage range was carried out. The batatron is advantageous in studying ocular radiation changes because of its depth-dose characteristics. Nearly uniform dosage may be obtained throughout the eye; or, if so desired, the dose in the anterior segment may be made quite low relative to that in the posterior segment. For the present investigation, conditions were so arranged that the dose was approximately the same for all depths of the eye so that relative susceptibilities of various portions of the eye might be assessed.

Most of the ocular changes observed in this project are in agreement with those cited by other workers using lower-voltage radiations. Descriptions of changes in the cornea, lens, uvea, vitreous, and hair are presented. Posterior subcapsular opacities were noted clinically, and corresponding changes were noted histologically four to six months after doses as low as 225*r*. The sequence of events in the morphology of cataract development after the first month following irradiation is described in detail. Cells resembling conjunctival goblet cells were noted in the corneal epithelium after high-dosage irradiation. Two phases of inflammation are described. The first

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[156] Biegel A. C. : Arch. Ophth. : Sept. 1955 : 54-3 : 392-406.

is an early transient uveitis, after doses as low as 1650*r*. The second is a delayed keratitis with anterior segment inflammatory change, after doses of 2700*r* or more. Granular change in the in the vitreous occurred after doses of 1800r or more. A mild hypotony four months after high dosage radiation was demonstrated with the aid of general anesthesia and biometric analysis. Slight change in the sensient layer of the peripheral retina was observed after higher doses. The sclera and optic nerve revealed no changes in this study, with use of ordinary histologic technique. Neither portal size nor type of beam (X-ray or electron) appears to influence the radiational effect of the betratron upon the rabbit eye.

157. **Radiation Effects on Lens Epithelium.**

Selective exposure of the equatorial and the central area of the lens to the deuteron beam confirmed the impression of high radiosensitivity of cells in the germinative zone–"the mitotic area"–of the epithelium in contrast to relative radio-resistance of cells in the large central part.

The effects of densely ionizing radiations (alpha particles and deuterons) and X-rays on cell division and cell degeneration in the lens epithelium of young rabbits were compared. For the five doses and six time intervals (from 1 to 21 days) the average of miotic and degenerate counts were weighted, and the specific RBE for these effects $\frac{\text{(rep of alpha particles or deuterons)}}{\text{(rep of X-rays produced by 210 kv.)}}$ was determined. In general, no significant difference in the effects of the two types of radiation on cell division (onset, delay, and overcompensating increase) was noted, but injury produced in the cell nuclei by isodoses of high energy radiations greatly exceeded that of X-rays.

The RBE of X-rays versus alpha particles for this radiation effect was statistically calculated as 4·1 varying from 2·7 to 6·1 at a confidence range of 99%. The RBE of X-rays versus deuterons was calculated as 3·9 and varied from 2·3 to 6·6 at the same confidence range. The effects of alpha particles and deuterons were of similar magnitude.

Long term observations of a brief series indicated that, following bombardment of the equatorial zone or of the entire lens with

Accurate positioning of the part to be exposed in the ultra-

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[157] Sallmann, L. Von. : Arch. Ophth. : Oct. 1955 : 54-4 : 489-514.

the same dose, in reps, of high-energy particles, the latent period between exposure and initial cataractous changes is much shorter than that following irradiation.

As in the other tissuses, the earliest radiation induced morphological changes, observed at the 20-minute interval, consist of chromatin bridges in anaphase and telophase of cells which had entered the mitotic cycle at the time of exposure. Extrusion of chromatin material from the cell nucleus often leads to the death of the cell. On the other hand, cells in which this sign of damage is less extensive may survive. Depletion of the cell population by death of the cells and failure in the differentiation of damaged cells seems to play a part in the eventual development of radiation cataract.

The cell degeneration caused by alpha particles and deuterons differs quantitatively but not qualitatively from that caused by X-radiation. Studies on age-induced cell degeneration in the lens epithelium of rats revealed a striking resemblance between the cytopathology of this cell layer in old age and that of lense exposed to ionizing radiations.

158. Reparation of Foetal Eye after X-radiation.

Foetal C F_1 mice were exposed on gestation day 12•5 to X-rays in doses ranging from 50 to 3000 *r* and the eyes were examined at 4, 24 and 72 hours, and at 6 days and 6 weeks thereafter to determine the cytological changes caused by the irradiation.

An exposure of 50 *r* had no discernible effect.

An exposure of 150 *r* caused extensive retinal, radionecrosis by 24 hours after irradiation, but this was cleaned up at 72 hours.

An exposure of 250 to 300 *r* caused about half of the presumptive retinal cells to break down or become pyknotic by four hours after irradiation. The damage was so extensive that cells continued to break down as they attempted mitosis. The active phagocytes were unable to clean up the debris until about 72 hours after exposure.

The greater the radiation insult, the earlier the evidence of cytological radionecrosis.

All X-irradiated foetal eyes exposed at 12•5 days to any level of radiation used appeared to be fully "repaired", or the retina was "reconstituted" by 72 hours after exposure.

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[158] Rough R. and Wolff J. : Arch. Ophth. : Sept. 1955 : 54-3 : 351-59.

While all exposed retinae were "reconstituted" they gave evidence of persistent damage in the form of microphthalmia. Foetal eyes exposed to 250 *r* had approximately 50% the volume of control eyes at the adult stage of 6 weeks. The retina was not proportionately reduced in thickness.

While the early foetal eye is extremely radiosensitive, it exhibits remarkable powers of repair and reconstitition. Whether the eye is functionally altered will have to be determined.

159. Studies on Radiation Cataract.

Lens changes resulting from irradiatiom have a critical dose level, using the same factors, for animals in the same age.

2. The minimal dose of cataractogenic level may be determined by histologic findings only, 160 days following exposure, and not on the basis of clinical symptoms.

3. The factors employed are 80 kv., added 20 mm. All filtration, 12 cm. target skin distance and 600 *r* to 2.000 *r* in single exposure or 150 *r* to 350 *r* once a week total five times in fractionated exposure, or 15 to 100 *r*, 80 to 185 times in continuous fractionated exposure.

The results are: minimal cataractogenic doses are 900 *r* in single exposure, over 150 *r* × 10 (1.500 *r*) at twice a week and under 300 *r* × 5 (1.500 *r*) once a week in fractionated exposure and under 50 *r* daily in continuous fractionated exposure. Minimal cataractogenic doses are always lower than epilation doses. Lens has alnost the same recovery power to the X-ray radition as other tissues.

160. Ultrasonic Energy Effects

A study was made of the effects of various doses of ultrasound on the eyes of rabbits; both enucleated eyes and normally situated eyes were used. Since some type of damage was observed in all the irradiated eyes of these rabbits, and since the minimal dose of ultrasound used was a single exposure of 10 watts, for two and half minutes, it appears likely that the minimal does that will cause damage to the eye is even less than the minimal dose used in this study when the stationary technique for applying ultrasound is employed.

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[159] Kandory F. : A. J. O. : April 1946 : 41-4 : 627-32.

[160] Moore C. H. : Arch. Ophth. : Dec. 1955 : 54-6 : 922-30.

sonic field is essential if reproducible results are to be obtained. Although the doses recommended by other workers for therapy are between 1 and 2 watts per square centimetre with the stationary technique, such doses are considered to be excessive in the light of this investigation. Ultrasound has a destructive effect on the eye of the rabit, and it is considered, of course , that ultrasonic therapy should not be applied to the human eye under the experimental conditions used in these studies. The amount of ultrasonic energy absorbed depends on the physical properties of the eye, the position ing of the eye in the ultrasonic field and the frequency and intensity of the ultrasonic source.

The difficulty of dosage and control of distribution would appear to constitute major problems in the therapeutic use of ultrasound.

Considerable and rapid increase in the temperature of the vitreous occurs during ultrasonic irradiation and this must be attributed to the absorption of ultrasonic energy. No liquefaction of the vitreous was observed during this study, in contrast to the findings of some other investigators. Cataracts developed in the posterior pole in the eyes of two living rabits irradiated with ultrasound; these opacities subsequently disappeared.

Further studies suggested by this investigation include a comparison of the effect of ultrasound on the eye of ther abbit in vivo when an isotonic solution of sodium chloride is used instead of mineral oil as coupling medium, and determination of the composition of thegas liberated from the tissuses during irradiation with ultrasound.

Books of Outstanding Value

1. Ophthalmic Medicine and Surgery with Sight-Testing. III Ed. 1953. Dy. Oct. 400 pp. 73 Ill, Rs. 12.

(*Pub.* : **The Kothari Book Depot, Bombay 12**)

2. Medical Jurisprudence for India–A Text Book for Students and Practitioners V Ed. Dy. Oct. 460 pp. 5 Ill. Rs. 10.

(*Pub* : **The Madras Law Journal Press--Mylapore–Madras**)

3. Pharmacology and Therapeutics with special ref. to Tropical Diseases II Ed. Part I. B.P. 1948 and Non-Offical Remedies and Specialities 200 Prescriptions & Antidotes. Cr. Oct. 400 pp.

(Rs. 7/8 reduced to Rs 5.)

Part II 1953. Recent Advances in Chemotherapy and Treatment with special ref. to Tropical Diseases. Contains 1951 & 1953 Addenda to B. P. 1948. Recent Non–Official Remedies and Specialities. Cr. Oct. 204 pp. Illustrated Rs. 5.

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Plastic Lenses in the Anterior Chamber with two case reports

BY

J. M. Pahwa, M. S. (Lucknow), D. O. Z. O. (Vienna)
Eye Hospital, Sitapur.

With the advent of proper anaesthesia and akinesia and various corneo-scleral stitches etc., cataract surgery has made many developments and strides during recent years. It is because of this that extraction of lens in toto (by intra-capsular forceps or suction, has become a safe procedure, and thus a case of binocular cataract has not to wait for indefinite time to reach the stage of maturity which used to be considered the right stage for operation. But looking to the various disadvantages of aphakic patients, it was H. Ridley who in 1949 introduced his first plastic lens in retro-iridiac space after an extra-capsular cataract extraction. I have already reported seven cases operated by this method. No doubt one of my cases (case No.1) had been lucky, because the lens did not dislocate even after an injury sufficient to fracture both bones of her forearm, but on the other hand one of these cases is having recurrent attacks of irido-cyclitis. Due to various complications like dislocation of lens, irido-cyclitis and opacification or wrinkling of posterior capsule after this operation, it has been abandoned by many of us today.

In order to extend its use and achieve better results Prof. Strampelli of Rome (Fig. 1) and Prof. Schreck of Germany (Fig. 2)

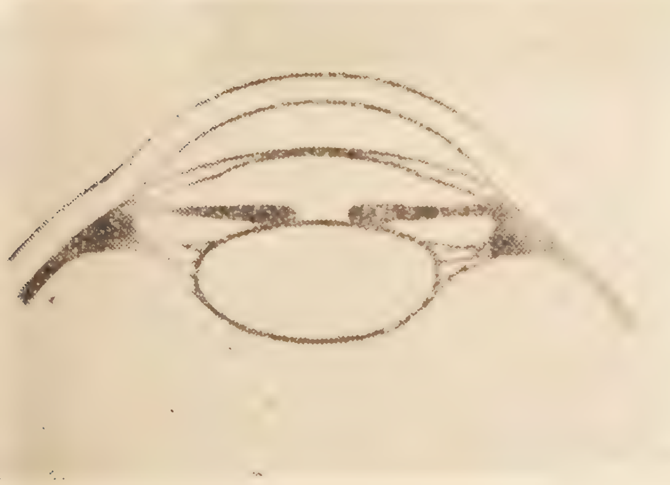


Fig. 1-a
oncave Strampelli Lens in Position

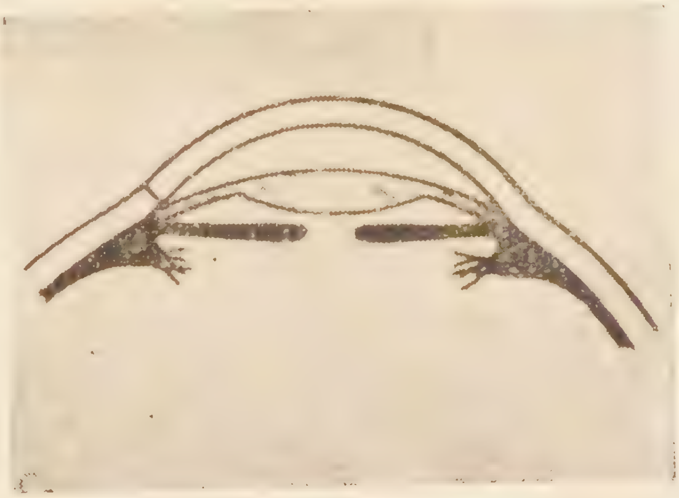


Fig. 1-b
Covex Strampelli Lens in position.

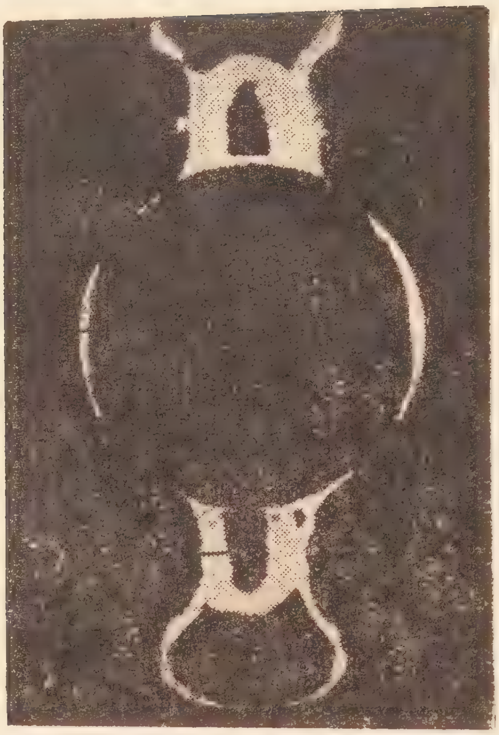
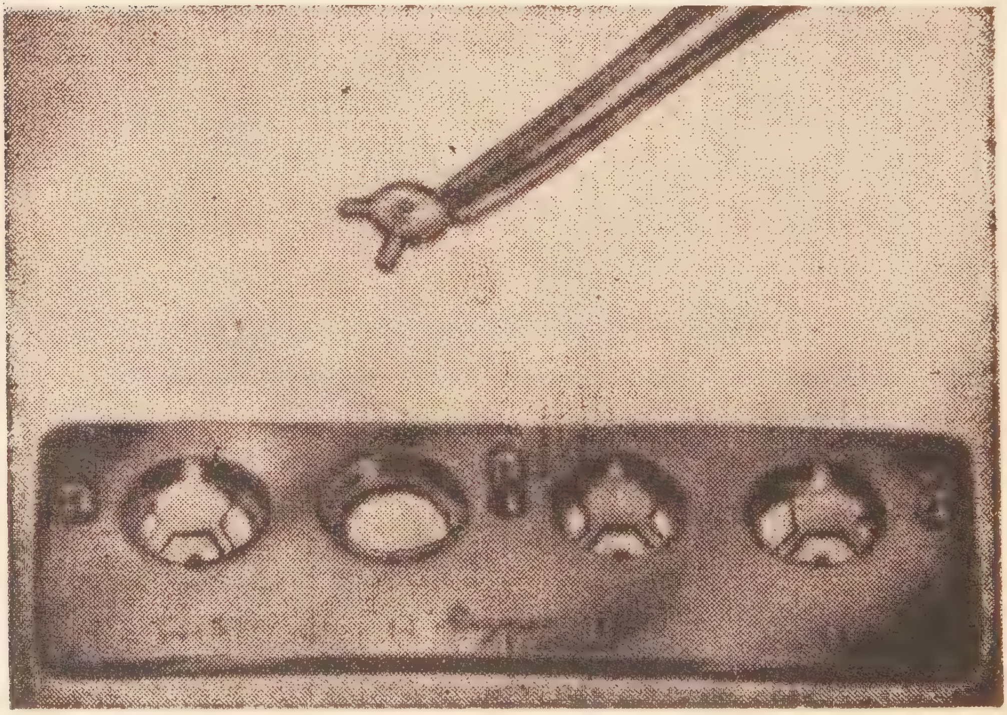


Fig 2. Schreck Lens.

conceived a new idea of inserting the lens in the anterior chamber and evolved new designs for such applications. Dr. Dannheim has still further improved the lens by making it very light (8 to 9 mg.) and having a loop of supramit plastic thread on each side of the central optical portion of the lens. Recently Ridley has used three curved legged implant.



Ridley's three-legged Anterior Lens with forceps and sterilizing rack.

Indications of this operation are:

1. Aphakia :—
   - (a) After intra-capsular extraction.
   - (b) After extra-capsular extraction.
   - (c) Aphakia with broad iridectomy and even prolapse of vitreous in the anterior chamber.

2. Anisometropia and unilateral high myopia.

These lenses unlike Ridley lenses are specially made for each individual case after doing the proper refraction of the patient by skiascopy and are of proper size as measured under slit-lamp. While ordering, the distance of the lens in the trial frame from the anterior corneal surface must be mentioned. The indications as I have described are much more, even it has made us possible to insert it in non-aphakic cases. These lenses are also well tolerated and even if need be can be easily removed without any adverse effect on the eye.

The radius of curvature of the non-optical part of the Strampelli lens is 14 mm. as smaller radius will make the plastic lens too curved which will make its introduction difficult and may also touch the corneal endothelium while larger radius will make the lens too flat and will continuously cause contact with the iris specially when it is placed in non-aphakic cases.

Sterilisation—

Do not use alcohol or other solvents. Do not use steam as the material is quickly damaged by it. Thirty minutes immersion in 1% cetavlon (I. C. I.) or armil is recommended. If there is any grease etc., it may be quickly dipped in absolute alcohol solution, but it should be well washed with penicillin solution just before use.

Operation—

The operation is usually done in two stages, the lens being inserted 4 to 8 weeks after a cataract extraction (intra-capsular or extra-capsular) or linear extraction in cases of traumatic or unilateral juvenile cataract. In non-aphakic cases like anisometropia or unilateral high myopia cases, question of second stage does not arise. No special instruments are required but a special forceps to hold the lens is just needed. Prof. Schreck has devised a special forceps and a spatula for the same. Similarly Dr. Dannheim has devised his own forceps for his lens. The operation is done under local anaesthesia and akinesia as required for a simple case of cataract extraction, but pre-operative miosis is preferred to avoid prolapse of vitreous in the anterior chamber specially when an intra-capsular extraction has been done before. A corneal incision is given with keratome (Fig. 3 a, b, c, d, & e)and enlarged by Westcott's Scissors or with the knife at the external quadrant. The incision must be wide enough to admit the lens

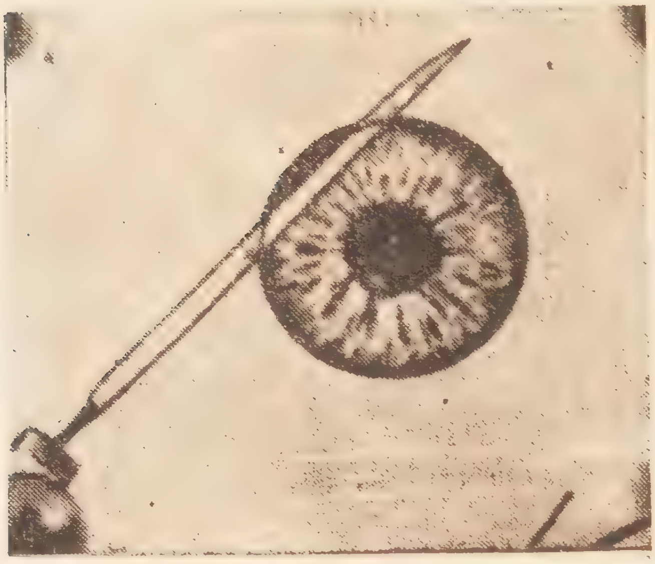


Fig. 3-a

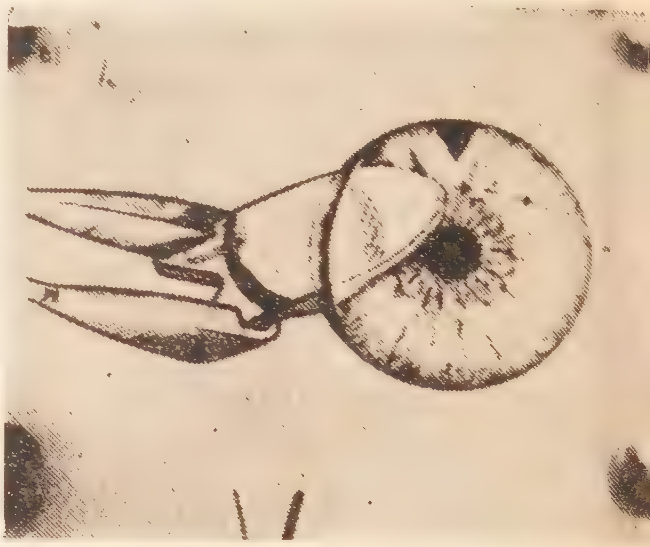


Fig. 3-b

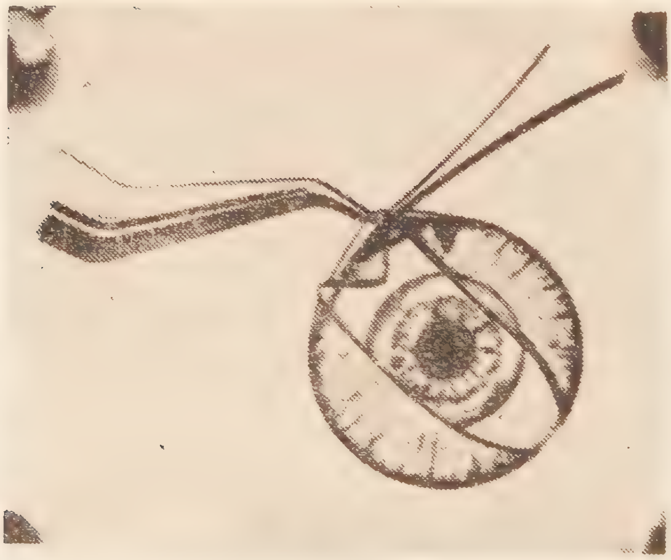


Fig. 3-c

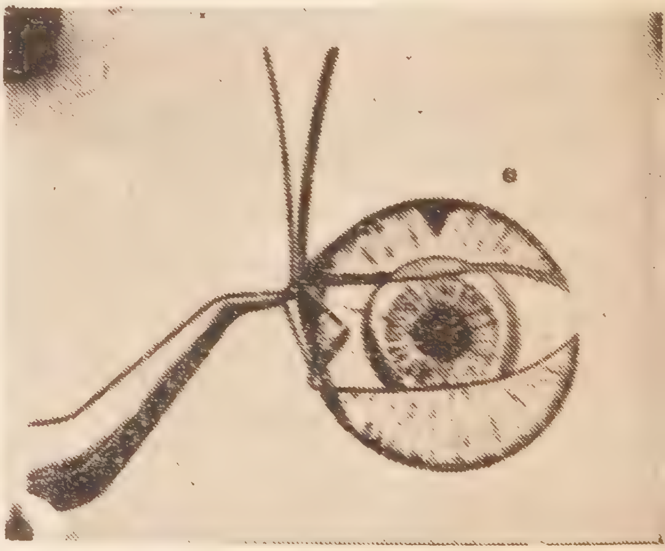


Fig. 3-d

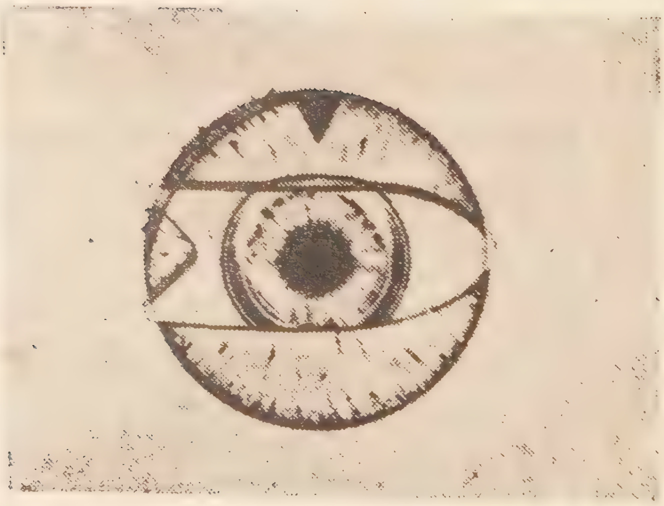


Fig. 3-e

without any difficulty. The section should be slightly corneal so that extremities of the lens once put in place do not touch or come in contact with the incision wound.

If the lens is introduced by a trans-scleral incision, there will always be a danger of the lens projecting through the wound. It should be inserted without exerting any pressure or causing any damage to the corneal endothelium. It must be gradually and gently slided into the anterior chamber across the sphincter pupillae without hooking round the pupil. When the proximal end of the lens is almost in the angle of the anterior chamber, a little pressure over both caudal ends accompanied by gentle traction of the scleral flap will be enough to bring the lens in correct position with the three ends resting in the chamber's angle. The lens is probably placed in the horizontal position because of:—

(1) Introduction is easier.

(2) Movements of the lids do not produce any displacement.

(3) No danger of getting the peripheral iridectomy hole blocked by resting tips of the lens while this is possible if the lens is in vertical position, thus producing secondary glaucoma.

(4) It is probably less visible.

In those cases where peripheral iridectomy has not been done before, it should be done now. Now the incision wound is closed by one or more fine silk sutures and a small amount of sterile air introduced into the anterior chamber, particularly if the iris has a tendency to come forward.

Even in eyes operated before for traumatic cataract etc. where one may have been forced to do broad iridectomy, the inclusion of the lens is not difficult in second stage because there is sufficient support for the lens. But in those non-aphakic cases where normal lens is in situ (anisomoetropia and unilateral high myopia etc.) one has to be very careful. Here incision should be wide in superior-external quadrant (Rt. eye 8 to 1 and left 11 to 4 o'clock). While doing peripheral iridectomy one should be sure that the deepest pigmentary layer of iris is not left behind. The lens is again preferably introduced in the horizontal position. 50,000 units of penicillin is given as a routine in all cases sub-conjunctivally before giving a binocular bandage.

Post operative care :—

It is the same as for any case of cataract operation. Procaine penicillin is given prophylactically for 2-3 days. First dressing is done on the 3rd day and local atropine and hydro-cortisone instilled daily thereafter. Diamox is also given for 3-4 days, because it helps in the formation of the anterior chamber and also prevents any non-inflammatory oedema of the cornea. Second eye is opened on the 8th day. Now orthoptic or plleo-optic exercises or education with after images by Kupfer's method of amblyopia can be usefully started after the inclusion of this lens.

Accidents :—

If one is careful, no accident can happen, but following can be possible :—

(1) **Imperfect Dimensions of the Lens** :—If the lens is big, it will cause deviation of the pupil and there may be hypotony due to small cyclo-dialysis caused by the lens edges. It may also be difficult to insert it and will also cause greater surgical trauma. On the other hand, if the lens is small, the lens will change its position in every movement of the eye which can produce micro-trauma in the iris. This can be easily managed if two lenses of the same power but of ·5 mm. size difference are kept in hand and one of suitable size inserted.

2. **Tearing of the corneal endothelium**:—It may be injured if one is not careful.

3. **Dragging the pupil.**
4. **Loss of Vitreous** :—It may be due to :
   - (a) Imperfect anaesthesia and akinesia.
   - (b) Undue and inopportune pressure.
   - (c) Imperfect miosis.
5. **Luxation of the lens** :—Only possible by brutal force.

Complications—

These again are rare but following may be anticipated :

(1) **Rise in Tension:**—It may be due to :

(a) neuro-vegetative irritation or blockage of the angle.

(b) blockage of the pupil or small peripheral iridectomy hole. This is easily avoided by placing the lens horizontally and one should be sure that the deepest layer of the iris is also cut.

(2) **Irido-cyclitis** :—This is not so severe and hydrocortisone drops locally checks that.

(3) **Pigmentary deposits or precipitates on the lens** :—These are usually not much, rather few and fine. They usually disappear without treatment.

(4) **Traumatic corneal oedema** :—This usually disappears and Diamox also helps it.

(5) **Late oedema of the cornea** :—This may be due to endothelial dystrophy at the point where the cornea touches the lens. No case has been seen but time will tell whether this can be severe enough.

Results—

During my recent visit to the continent I had the occasion of watching several such operations and seeing many-operated cases at Barcelona. Till then (July 56) nearly 50 cases were operated and out of this 15 were in non-aphakics (anisometropia and unilateral high myopia) and the oldest one of 1½ years' duration. These lenses were well tolerated and no complication was seen in any case except secondary glaucoma which occurred in two cases. These cases were cured by rotating the lens to horizontal position and doing another small iridectomy as in earlier cases the lens was placed in vertical position. In the second case cyclo-diathermy was also done as a prophylactic measure. Routine tonometry in all cases after this operation showed little hypotony which normalises after 15-20 days. Gonioscopy was done in all the cases and it was seen that if the size of the lens is correct, no changes in the angle or any goniosynechias were seen. Only a small zone of partial iris atrophy may be seen in old cases. If the size of the lens is bigger, it might cause small cyclo-dialysis or depression of the iris root with secondary pupillary deviation.

In young children as the eye will enlarge with age, the lens can be changed also later on without any adverse effect on the eye. If there is any thickening of posterior capsule or it becomes opacified, capsulotomy can be done through behind the lens without touching or injuring the lens (Fig. 4). Air injection can be also given in the anterior chamber to prevent prolapse of vitreous.

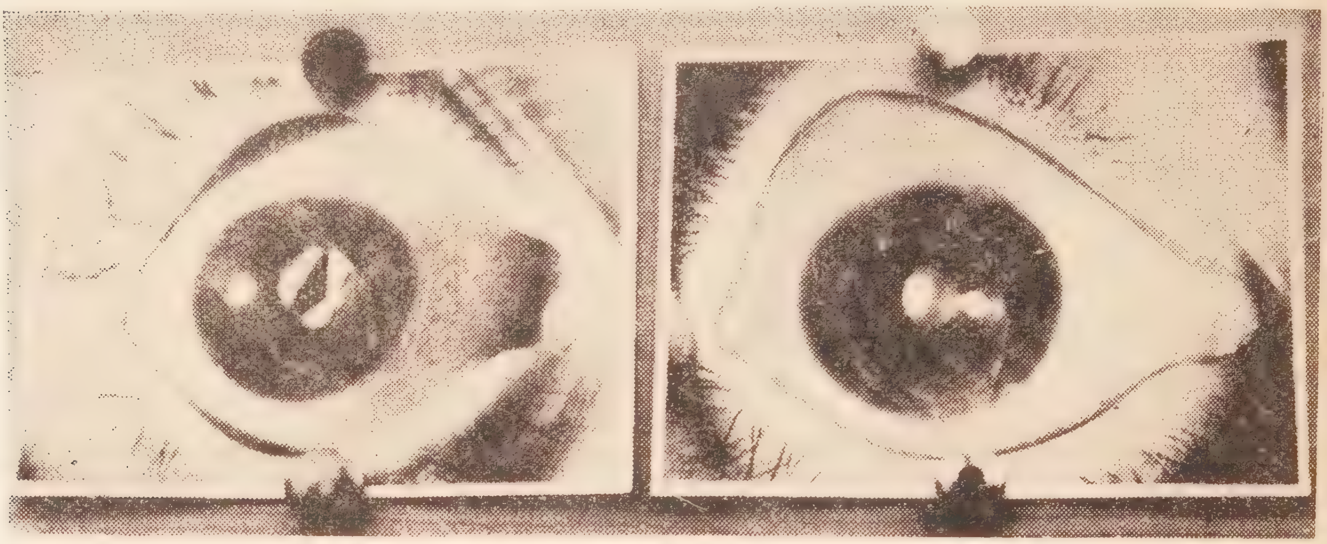


Fig. 4

My personal experience consists of only two cases which are being described over here.

Case Reports :— 1. Mr. Baij Nath Singh, 55, Hindu male, was admitted in this hospital for left cataract and right aphakia with broad iridectomy in this eye on 16th October 1956. Strampelli Lens of proper size was introduced in the right eye on 20th October 1956. On making an incision, it was found that vitreous was in the anterior chamber. The lens was introduced carefully in front of the iris without engaging the iris margin of the broad iridectomy coloboma and was placed in the horizontal position to avoid any chance of secondary glaucoma. Sterile air was injected in the anterior chamber before closing the wound by a fine stitch. The first dressing was done on the 3rd day. The cornea was found to be slightly hazy and chamber had not formed yet. Diamox was started now (1 tablet every 6 hours). Cornea became clear with this and local atropine and cortisone drops. The bandage was opened on the 10th day. He was discharged on 16th of November 1956 and vision was 6/18 with plus 2 cylinder axis 120°. Patient came to the hospital on the 9th of December 1956. His vision was 6/12 with minus 1 Sph. and plus 2·5 cylinder axis 125°. On slit lamp examination there was no flare, but there were fine deposits on both the surfaces of the plastic lens. Fundus could be seen and was normal.

2. Mr. Chandra, a case of traumatic cataract due to perforating injury in childhood was operated for linear extraction three months back. His vision was 6/18 partial but binocular vision was not possible. Strampelli Lens of suitable size was placed from above vertically. The lens was well tolerated and he could fuse the image with additional glasses of —1·25/ + 2·5 cyl., axis 160° (6/12 partial vision).

From the results, it is clear that this is well tolerated even in non-aphakic cases, so this type of implant opens up a new and promising future for unilateral anisometropic cases. Though we will have to wait a little bit more to gauge its results, and we should be cautious in making selection of cases for this intervention, our earnest efforts must continue ceaselessly for the benefit of our hopeless patients and progress of ocular surgery.

References :--

Barraquer :—Eustudios Informaciones oftalmologicas Vol. VI, No. 15. Read before the Oxford Ophthalmic Congress in July 1956.

Dannheim :—Read before the Heidelberg Conference in August 1956.

Schreck :—Proceedings All German Congress Heidelberg 1955. (Reprint 212-222),

Strampelli B:—An diottane. clin. ocul. LXXX, No. 2, 11-54.

Ridley :—Practioner May, 1957, Page 532.

BOOK-REVIEW

Ophthalmic Medicine and Surgery with Sight-Testing. By Dr. M. A. Kamath. 3rd edition, pages 382; Price Rs. 12/- Sole Distributor, Messrs Kothari Book Depot, Bombay 12.

This book, first published in 1926, has now entered the 3rd edition. It is a useful book for the young practitioner practising in outlying rural areas. The information given in the book is well presented and in keeping with the standards in use in India.

Examination Results

UNIVERSITY OF AGRA

M. S. (Ophth.) 1956.

1. Dr. Indreshwar Narain Raizada.
2. Dr. Rameshwar Pd. Saxena
3. Dr. Shiva Das Mukerji.

UNIVERSITY OF ALIGARH

D. O March 1956.

1. Bhartendu Agarwal.
2. Gokul Prasad Shukla.
3. Ishkumar Chaudhry.
4. Parduman Singh Dugal.
5. Pran Nath Kaul.
6. Ratan Singh Mudgal.
7. Balbir Singh Purai.
8. Bhanuskankar Harilal Pancholi.
9. Prem Kumar Dhir.

UNIVERSITY OF BOMBAY.

M. S. (Ophth.) October 1955.

1. Dikshit Piyush Ananthnath
2. Maskati Badruddin Tayebbhai

May 1956.

1. Sathe Shripad Moreshwar.

UNIVERSITY OF NAGPUR

D. O. 1956.

1. Shri. Rajendrakumar Mishra
2. Shri. Ishwar Chandra.

UNIVERSITY OF LUCKNOW

D. O. M. S.

1955-56 & 1956-57.

1. Kailash Nath Gupta.
2. Ramesh Chandra Sharma.
3. Har Narain Khanna.
4. Kamal Kumar Sarkar.
5. Radhey Shyam Dwivedi.
6. Salig Ram.

UNIVERSITY OF PATNA

M. S. (Ophth.) 1956.

1. Kanak Narayan Sinha.
2. Ram Heramb Prasad Sinha.

UNIVERSITY OF PUNJAB.

D. O. M. S. PART II

1. Avinash Chandra Chadha.
2. Devender Kumar.
3. Hem Raj Jindal.
4. Surian Singh.
5. Hira Nand Chabra alias Hira Ram.
6. Hanumant Rao Diwan.

Society Proceedings, Reports &c.

The Poona Ophthalmological Society

Convener : Dr. L. N. Deshmukh, 9B Budhwar Peth; Poona 2.

The 33rd Clinical meeting.

The 33rd clinical meeting of Poona Ophthalmological Society was held at 4 p. m. on 21-2-1956, at Sassoon Hospital Staff room.

Dr. G. D. Apte was in the chair the following cases were presented.

(1) **By Dr. L. N. Deshmukh.** (1) Case female aged 30 years. Defective vision in R. E. with divergent squint. No special complaints from the patient. History of fever preceeded the defective vision. Vision R. E. F.C. at 1/2 meter and L.E. 6/24. On fundus examination there was central macular degeneration with pigmentary changes in the R.E. Kahn's Test negative. Urine N.A.D. B. P. 120/78. She is using 0•5 lens for the left eye.

(2) Female aged 35 with pregnancy was referred to O.P.D.. of Sassoon Hospital for fundus examination. No special complaint about eyes. On examination typical diabetic retinopathy—dot-shaped haemorrhages, yellowish exudates and some areterio-sclerotic changes were discovered in both fundii. On questioning, the woman gave a history of diabetes.

(2) **By Dr. G. D. Apte** : (3) Female aged 23 years delivered recently 15 days back came to him complaining of blinding of vision both eyes. She got married at 20 years. Had T.B. left lung; apical cavity seen in skiagram taken on 10-2-1954; was treated with PAS, Streptomycin, Dihydrostreptomycin etc. Had conception in May 1955. In October 1955 and January 1956 had edema, albumin in urine and fits; complained of blurred vision but no specialist was consulted. Delivered in February 1956. Vision R.E. F.C. at 6" and L.E. P.L.

Fundii : both eyes showed typical albuminuric retinitis with haemorrhages, whitish heaped up exudates and neuritis of both optic nerves.

The fundus trouble was evidently secondary to toxaemia of pregnancy either due to eclampsia or nephritis etc. But the main discussion centred round the possible cause of toxemia; whether intensive therapy with anti-T.B. drugs has damaged the kidneys primarily? What should be the treatment now and what is the prognosis? No satisfactory reply could be forthcoming.

A letter from the Ministry of Health regarding Government-arranged eye camps and the services of the Poona Ophthalmological Society was read out. A letter from Dr. S. N. Cooper to Dr. D.G. Patwardhan of a private nature as regards the Eye Camp was read out. A letter from the Secretary, Indian Medical Association, Poona Branch requesting the society to take official part in the 2nd Poona Medical Congress to be held on 1st and 2nd of June 1956 was read out and Dr. L. N. Deshmukh was authorised to represent the Society.

6th Annual Report 1955-56

The Society finished 6 years of its existence on "Gudi Padwa day" 1956 and it has now entered into the 7th year. We have been holding our meetings regularly once in two months all along. This year, it is regretted that the attendance of the members is thinning out and so also the number of clinical cases. The Society requested the members to take part actively in the clinical meetings, to present interesting cases and to create lively discussion. It is reported that some of our members are very regular in showing ophthalmic cases before other medical society meetings. They are requested to show the same interest and enthusiasm towards the Poona Ophthalmological Society. We have received a reply from the Health Minister, Government of Bombay about offering our services to the Government-arranged Eye Camps. They have addressed a letter to Dr. Chitnis, the Surgeon in charge of the Central and Southern Divisions to take our help in case it is needed.

The following cases of interest were demonstrated during the year 1955-56 by the various members :—

By Dr. N. C. Kothari :—(1) A case of Synchysis scintillans, both eyes. (2) A case of ptosis right eye after operation on the zygoma bone for osteomyelitis. (3) A case of detachment of retina left eye in lower half and hazy media with choroiditis R.E.

By Dr. L. N. Deshmukh :—(4) A case of Eale's disease. (5) A case of anaemia with fundus changes restricted to R.E. multiple haemorrhages fairly large in size and tortuous blood vessels with retained good vision 6/12 and full field of vision. (6) A case of synchysis scintillans. right eye. (7) A case of diabetic retinopathy. (8) A case of uniocular central macular degeneration in a female aged 30 years. (9) A case of anaemia with blochy type of haemorrhages with a typical gray centre.

By Dr. Telang :—(HOUSEMAN) (10) A case of iridocyclitis with K.P.s.

By Dr. Ghorpade :—(HOUSEMAN) (11) A case of ptosis and thickening of left upper lid.

By Dr. V. D. Sathaye :—(12) A case of retinitis pigmentosa with secondary optic atrophy. (13) A case of coloboma of iris both eyes with probably developmental anomalies deeper inside.

By Dr. G. D. Apte :—(14) A case of albuminuric retinitis both eyes in a female aged 21 years developed during the later months of pregnancy and continued after delivery.

In all only 14 cases were demonstrated as compared to 27 during the previous year. The response from Tarachand Ramnath Hospital was rather poor and that from K. E. M. Hospital very poor. I hope in future more interest will be shown by the members by way of attendance and clinical material.

6th Annual General Meeting

The 6th Annual General meeting of the Poona Opthalmological Society was held at "Sevasadan Hall" on Sunday the 15th April 1956 at 7-30 p.m.

By Dr. M. G. Bhide was in the chair. Dr. L. N. Deshmukh read out the annual general report. He was sorry to note the poor response from the members as regards the demonstration of cases and also the attendance and he hoped that there would be improvement on both in future. The members were proud to note that Dr. D. G. Patwardhan was the preseident-elect of the next All India Ophthalmic Conference. Col. B. Basu said that it was not only an honour to Dr. Patwardhan but the Poona Ophthalmological Society as a whole was honoured, as the President of the All India Ophthalmic Conference would be from Poona. Col. Basu requested the members of the Poona Ophthalmological Society to take active part and attend the next All India Ophthalmological Conference in large numbers. Dr. M. G. Bhide as chairman congratulated Dr. Patwardhan for this honour and as a mark of respect Dr. Patwardhan was garlanded by him on behalf of the society. Dr. D.G. Patwardhan replied that he was well aware of the responsibilities as a President of the All India Ophthalmological Society and he said he would do his best to execute his duties and with the cooperation of members of the Poona Ophthalmological Society, he was confident that his work would be much easier. Major Banerjee from the Military Hospital became our new member from this year. Major Banerjee suggested that it is not always necessary to show complicated cases at the clinical meetings. The meeting was followed by dinner served in Indian style and after that the annual function was over.

34th Clinical Meeting (7th YEAR)

The 34th Clinical meeting of the Poona Ophthalmological Society was held at 4 p.m. on 19-6-1956, at Tarachand Ramnath Hospital.

Col. B. Basu was in the chair. The following cases were demonstrated by Dr. V. D. Sathaye and Dr. N. V. Bhave

Case No. 1 : A male S. M. A. aged 23 years was struck on 21-3-1955 by an iron bar, while asleep over the left eyebrow. The patient became unconscious and was removed to the Sassoon Hospital and stitches were taken over the left eyebrow. After that he noticed that the vision in the left eye diminished. Now vision R.E. was 6/6, L.E. 6/60 part no error of refraction; Findings : L.E. optic atrophy; temporal; what could be the cause of this optic atrophy ? Blood for Kahn and X-ray of skull was suggested.

Case No. 2. : Male aged 50 years complained of defective vision L. E. Started with redness and watering and then gradual loss of vision. Vision R.E. 6/6 L.E. 6/36 but smoky. On examination—cupping of optic disc left eye with pallor—suggests glaucomatous cupping with atrophy.

Case No. 3. : A male child 3 years old with blindness both eyes. History of fits when 1 year old. Frequent attacks every 2-3 months. Had a fall 2½ months back. Examination revealed optic atrophy both eyes. It was suggested that this case be referred to a neuro-surgeon.

Case No. 4. : Male child 2 years old, had pyrexia 6 months back. Two months back parents suspected white opacity in pupillary area and also dim vision. Diognosis--Congenital cataracts both eyes. Points raised as regards treatment were whether needling only should be done at first sitting and resorted to again if necessary or whether needling and curette evacuation should be done at the same time.

Case No. 5. : Male aged 19 years had trauma to right eye 10 months back with 'Pankanees' पानकणीस and was treated for redness and watering. Now complains of defective vision: vision R.E. F.C. at 4′ and L.E.—6/6 Part.

Dignosis :—Kerato-conus right eye. Point was raised as to whether trauma has any relation with the condition. It should be tried whether he could be improved with contact lenses.

Case No. 6. : Male aged 33 years: in 1944 suffered from crops of boils; 5-6 months after that suffered from headache and vomiting and some defect in vision and micropsia. After further 6 months he had vision only for the lower half of an object. Vision R.E. F.C. at 2 feet and L.E. 6/6. On examination right eye showed macular haemorrhage, disseminated choroiditis with detachment of retina in lower part of the retina. Dr. L. S. Bhave thought that instead of detachment there was a cyst of the retina.

Case No. 7. : Male aged 21 years. History of trauma with a stick 9 months back to R.E. Had oedma and redness and watering. Now vision is much diminished in right eye. Vision R.E. F.C. at 2 feet. On examination there was a big band stretching across the whole of the retina obliquely suggestive of a choroidal tear and also retinal detachment in the lower part.

Case No. 8. : A case of ptosis of left upper lid operated successfully by Hess' operation (modified).

Cases Nos. 9 & 10. : Two brothers (young age) from the same family operated for glaucoma were shown. Mother had also suffered from glaucoma. Cases were shown to impress the genetical aspect of the etiology.

Case No. 11. : An old case of detachment of retina, where scleral resection was done, was shown. He had kept up 2/60 vision with glasses.

Case No. 12. : Male aged 20 years. History of severe headache. Vision left eye lost 1½ years back and right eye 4 months back. Loss was gradual. Examination revealed optic atrophy both eyes.

Cases Nos 13 & 14. : Two cases of concomitant squint operated for cosmetic purposes were shown.

Before the start of the meeting a condolence resolution was passed on the passing away of the noted Ophthalmologist Dr. Friedenwald.

The meeting terminated with a note that information regarding clinical cases should be as complete and exhaustive as possible and a vote of thanks to the chair.

35th Clinical Meeting

The 35th Clinical meeting of the Poona Ophthalmological Society was held in Sassoon Hospital Staff Room at 4 p. m. on 28-8-1956,

Dr. V. D. Sathaye was in chair. The following cases were demonstrated by the staff of the Sassoon Hospital. Poona, namely Dr. N. C. Kothari, Dr. L.N. Deshmukh, and Dr. A. D. Patwardhan.

Case No. 1. : Male aged 16 years. Came to O.P.D. for ptosis of left eye upper lid. 8 years back he was alright. Then he had an attack of conjunctivitis in that eye which was followed by ptosis of the upper lid. Clinically preauricular glands not palpable, conjunctiva lachrymal sac etc. normal; urine, screening N.A.D. W.B.C. count 7800 per cmm.; V.D.R.L. Negative. It was thought as to why ptosis should develop after an attack of conjunctivitis. The frontalis was also not acting very powerfully. Operations suggested were Hess's modification and resection and advancement of levator palpebrae superior.

Case No. 2. : Female aged 14 years. Came to O.P.D. for defective vision. Had an attack of diphtheria 2 years back. Vision each eye 6/60. On examination, opacities in central part of the lens more towards the posterior pole with radiating linear opacities in each eye were seen. It was thought that the case is one of developmental type of cataract and the attack of diphtheria had nothing to do with this abnormality.

Case No. 3. : Male aged 35 years. Came for defective vision in right eye 15 days back. He had injury to that eye with a blow some time back. After the blow he had pain for 3-4 days and then watering and some discharge. He noticed considerable diminution of vision 3-4 days after injury; vision R.E. F.C. 6" L.E. 6/60; Retinoscopy -4·0 D, both eyes.

On examination right eye revealed detachment of retina in practically the whole of the lower half and tension was low to fingers. Left eye showed myopic crescent. It seemed to be a case of moderate myopia and the trauma precipitated the detachment of the retina.

Case No. 4. : Female middle-aged complained of defective vision. R. E. 5 meters F.C. L.E. 6/24. Retinoscopy.

R. E.	L. E.
−1·0	−1·5
−1·0	−1·5

No improvement with glasses. Examination of fundii showed some haziness of the media and pale discs R 7L, A provisional diagnosis of optic atrophy was made. V. D. R. L. negative. Field of vision and central field record on Bjerrum's screen may help the diagnosis.

Case No. 5. : Male aged 38 years with an intractable iridocyclitis of right eye was shown. He did not respond to the usual line of treatment at all. The lesion used to be quiet at times and acute at times. At times it showed a picture of sclerosing keratitis . His Kahn's test was 4 plus. He was given a full course of penicillin in the V.D. Dept. Then he was given a course of N.A.B. and Bismuth under the guidance of Dr. Kothari. Recently cortisone drops were started and that considerably quietened the eye. One will have to observe, whether the eye would remain quiet or again get an acute attack. It was suggested that cortisone should have been tried at an earlier stage.

Case No. 6. : Male aged 56 years. Had aphakia both eyes of about 3 years' duration. He came for defective vision and pain in the L.E. On examination of left eye there was ciliary and conjunctival injection. Pus and blood in anterior chamber. Tension was normal and vision only P.L. It was thought by Dr. Kothari to be a case of metastatic gonorrheal iritis with hypopyon.

Treatment given was local penicillin drops, mist. Pot.-iodide by mouth, milk injections; aureomycin capsules orally, irgapyrine. There was a slight reduction of pus in A.C. The progress towards recovery was of short duration and the cornea became cloudy and at the limbus at one place the pus had tried to point. So it was decided to enucleate the eye. In spite of some pus and in spite of the threatening perforation, Dr. Deshmukh enucleated the eye and the patient had a rapid recovery.

Case No. 7. : A boy aged 12 years came for defective vision. On examination both cornea were hazy, of ground-glass-like appearance and there was also ciliary injection. Diagnosis of interstitial keratitis was made. Blood is sent for V. D. R. L. Treatment given : milk injections, cortisone drops and penicillin drops and guttae atropine.

The meeting terminated with refreshments and a vote of thanks to the chair.

36th Clinical Meeting

The 36th Clinical Meeting of the Poona Ophthalmological Society was held at K.E.M. Hospital, Poona at 4 p.m. on 16-10-1956.

Dr. L. S. Bhave was in the chair. The following cases were demonstrated.

Case No. 1. : By Dr. L. N. Deshmukh. A female aged 20 years had gradual loss of vision both eyes. Now vision was F.C. at 10-12′. On examination there was iridocyclitis in both eyes with K.P.s in both eyes. The patient is pregnant at present Diagnosis : Chronic iridocyclitis of a quiet insidious type. The pregnancy had nothing to do with the disease. Report of Kahn test is awaited.

Case No. 2. : By Dr. M. G. Bhide : A boy aged 10-12 years complaining of defective vision. On examination patient was found to have nystagmus, cogenital coloboma of iris in both eyes and cataract in right eye. Case was interesting from the point of view of developmental anomaly.

Case No. 3. : By Dr. L. S. Bhave : Male aged 23 years complained of considerable and sudden loss of vision of his left eye, duration 15 days. Patient had finger counting vision only. After examination under mydriatic vitreous and retinal haemorrhages were detected. Fundus picture details obscure due to hazy media. E.S.R. normal. Kahn test negative. Diagnosis suggested was Eales' disease.

Meeting terminated after tea and light refreshments and a vote of thanks to the chair.

37th Clinical Meeting

The 37th Clinical meeting of the Poona Ophthalmological Society was held at the Military Hospital, Poona 1, at 4 p.m. on 11-12-1956.

Col. B. Basu was in the chair. The following cases were demonstrated. (1) A male aged about 40 came for presbyopic correction; vision each eye was 6/6 p. On correction for reading he could read J. 1 in each eye. On fundus examination in R. E. by the side of the optic disc on supero-temperal aspect, three bluish discoloured areas, highly vascularized were seen. Tension normal both eyes. Patient had no complaints of any kind. Diagnosis of tumour was suggested. The opinion was divided, some surgeons supported the diagnosis but some thought that the condition was of no significance. It was decided that the case should be kept under observation.

Case No. 2. : By **Dr. V. D.** Sathaye. A young boy about 10-12 years old had a perforated injury in the left eye. He had developed traumatic iridocyclitis and with treatment the vision which was counting fingers at few feet is now 6/24 part in that eye.

Case No. 3. : A girl aged about 18-20 years had a big prolapse of the iris secondary to perforated corneal ulcer and some septic infection. With medical line of treatment with guttae atropine alternatively with guttae eserine plus usual treatment the eye is saved from enucleation and now the vision is M.B. or finger counting at 6″ under favourable conditions.

Case No. 4. : By Major Banerjee : A case of detachment of retina in a young adult operated upon with diathermy apparatus : Detachment well settled and vision confirmed to 6/36 R. eye.

Case No. 5. : A case of total detachment of retina with squint and hypotomy. R. E.

Case No. 6. : A case of traumatic cataract R. eye with typical sectoral rosette formation.

Case No. 7. : A young girl; a case of penetrating injury R.E. with five eyelashes in the anterior chamber. About 6 eyelashes removed from A.C. by operation. As the eye is quiet, it is decided not to interfere any more.

Case No. 8. : A case of penetrating injury with aphakia R.E. Cortex + + ; media hazy, vision with glasses 6/60. As the eye is pretty quiet it is unlikely that aphakia is secondary to the penetrating injury. Aphakia must have been there for a long time and the injury has nothing to do with the diminished vision.

Meeting terminated with a vote of thanks to the chair.

All India Ophthalmological Society.

Hony. Secretary, Dr. Y. K. C. Pandit, Bombay Mutual Buldings,
2nd floor, Hornby Road Bombay 1, (India).

The All India Ophthalmological Society was first established in the year 1929 and started functioning in the year 1930. Dr. Zachariah was its original Secretary, a post which he held till the year 1948 and is still editing the Proceedings of the Society.

The Society later joined the Federation of National Ophthalmological Societies and thus established a link with international ophthalmology.

The Society during these years has done great service to the country in more ways than one.

First it has established a more flexible constitution, secondly it has a quarterly Journal of its own, thirdly it has placed before the Government of India a scheme for the Institute of Ophthalmology for the Country and an Eye Bank, fourthly it has moved the Government at the Centre to alter its visual standards for they were considered too rigid and not in consonance of what is being accepted today in other countries of the world. The scheme for research in ophthalmology was formulated by a special committee of the Society in pursuance of a resolution carried unanimously by the Society at its Bombay Conference and is before the Government for consideration in the Second Five Year Plan.

The Society holds an Annual Conference which is visited by several distinguished ophthalmologists abroad. The time is fixed for the third week of February each year.

An Adenwala Oration takes place every alternate year and an award is offered to the best paper selected by the Scientific Sub-Committee for the Oration.

The Society now organises conferences with an eye for the improvement of the Ophthalmic standards, and every year invites ophthalmologists of repute from abroad to take part in the conference deliberations thus bringing to its members some of the latest developments in the field of ophthalmology.

It celebrated its Silver Jubilee at Aligarh in 1956 and Prof. Ramon Castroviejo and Dr. Keith Lyle were the chief guests from abroad. The symposium for that year was Diseases of the Optic Nerve. The symposium for 1957 was trachoma and a number of foreign trachomatologists have been invited. The symposium for 1958·is Therapy in Glaucoma and for 1959 Ophthalmology in relation to Industry.

The conference was held at Aligarh in Feb. 1956 under the presidentship of Dr. V. K. Chitnis. It was inaugurated by Hon'ble Rajkumari Amrit Kaur, Minister for Health at the Centre. Dr. Chitnis spoke on the history of the Society and importance of Research, Visual standards, Corneal grafting and eye bank etc. The conference lasted for four day sand Prof. Castroviejo spoke on the several important themes like detachment of retina, modern aspects of cataract surgery, glaucoma etc. Prof. Keith Lyle gave a talk on Squint, and Dacryocystorhinostomy.

Bombay Ophthmologists' Association

Hony. Secretary Dr. B. B. Velankar, 213, Charni Road, Bombay 4·

1. The Bombay Ophthalmologists' Association was started in the year 1946. Present strength of the members is about 40. Monthly meetings are held on third Wednesday of each month when interesting cases are demonstrated and discussed.

2. Annual Report for the year 1956 : During this year 8 clinical meetings were held. Cases were demonstrated and discussed. Junior members of the profession took keen interest in the discussion. During second Bombay Ophthalmologists' Convention at Ahmedabad, our members played a very active part. Our President Dr. Chitnis had the honour to propose a toast on behalf of the delegates.

Delhi Ophthalmological Society.

Hon. Secretary Dr. D. V. Sethi, 21st Faiz Bazar, Daryaganj, Delhi-7.

The Society completes its 8th year since its inception and it gives me great pleasure to say a few words about its activities during the past year.

The Executive Committee met twice during the past year and we have had seven clinical meetings. We were rather unfortunate in not having amongst us so many foreign ophthamlologists as last year. We have had the pleasure of meeting Doctor R.

Castroviejo and listen to him at the Annual Conference of the All India Ophthalmological Society at Aligarh. He very kindly agreed to our request and talked to the members of the Society in February 1956 on Surgery for Glaucoma with special reference to the role of Cyclodiathermy. He also showed a film describing a new method of shortening of the Eye Ball in Retinal Detachment. It was rather unfortunate to miss Mr. Keith Lyle, an eminent Ophthalmic Surgeon from Londón, who though had agreed to our request to address the members of the Society, had to leave the country due to unavoidable circumstances.

In July 1956 we had the pleasure of listening to Dr. L. P. Agarwal of Medical College, Agra, who gave a beautiful talk on Conjunctival Smear Cytology in Ocular Diagnosis.

At the rest of the meetings held, the members had an opportunity of seeing very interesting and rare ocular conditions.

The meetings were held in rotation at Shroff's Eye Hospital, Irwin Hospital and Sir Ganga Ram Hospital and I am grateful to the authorities concerned.

The Ophthalmological Society of Hyderabad.

Secretary Dr. V. Kalyanaraman, Sarojini Devi Hospital, Asafnagar Hyderabad.

The Ophthalmlogical Society of Hyderabad was started in March 1952, with a view to bringing together doctors interested in Ophthalmology and to have monthly clinical meetings where cases of interest could be discussed.

The office-bearers for the year 1956 were :—President : Dr. B. K. Phatak. Vice-President : Dr. P. Ramchander. Secretary. Dr. V. Kalyanaraman. Jt. Secretary and Treasurer : Dr. M. V. Jagannatha Row.

During the year 1956, eight clinical meetings were held. The association held its annual picnic lunch at Meer Alam Guest house, when Dr. Dastoor of Bombay was the chief guest. During this year the association had the unique privilege of having in its midst Prof. Velhagaen, Prof. of Ophthalmology Leipzig University, who gave a series of interesting lectures and slide demonstrations. We had to record this year the sad demise of two leading ophthalmologists of our country Sir J. N. Duggan and Dr. R. E. S. Muthayya.

Annual Report of the Working of Eye Hospitals and Eye--Wards 1955.

(A = Private Agency; B = Local Body; C = Government; D = Semi-Government; E=Missionary Society. *Temporary)

Province Name & Place	Managed by	No. of Eye beds	Total No. of beds	Major Eye Operations	Total Eye Operations	Annual Total Out-door
SPECIAL EYE HOSPITALS						
ANDHRA PRADESH						
Eye Hospital, Kachiguda Hydrabad Dn.	A	4	-	40	60	1080
Sree Krishna Eye Hospital, Tenali	A	45	-	1486	1985	9491
BENGAL						
Eye Infirmary, Medical College Hospitals. Calcutta. 12	C	139	853	2670	9217	59,940
BOMBAY						
Eye Hospital Anand	A	20	-	80	134	31,75
Seth Haji Meghajibhai Pradhan Free eye Hospital, Bharapur. (Bhuj-Kutch)	A	15	-	90	619	19,920
B. P. A. Municipal Free Eye Hospital, Kamathipura, Bombay 8.	B	12	-	212	1172	86,956
Sir C. J. Ophthalmic Hospital, Bombay 8.	C	100	-	1365	3992	29,466
R. N. C. Free Eye Hospital, Bulsar	D	36	-	397	1596	73,43

Province Name & Place	Managed by	No. of Eye beds	Total No. of beds	Major Eye Operations	Total Eye Operations	Annual Total Out-door
Free Eye Hospital, Chalisgaon	B	24	-	537	654	21,987
Social Service League Free Eye Hospital, Kalyan	A	16	-	-	370	3,829
DELHI						
Dr. Shroff's Charity Eye Hospital, Daryaganj	A	104 *174		2476	6185	1,08,791
Sant Parmanand Blind Relief Hospital Delhi	A	52	-	5881	6292	1,92,715
MADHYA PRADESH						
Mahatma Gandhi Eye Hospital, Raigarh M. P.	A	100	-	-	1601	10,877
MYSORE						
Minto Ophthalmic Hospital Bangalore (2)	C	205	-	1436	12358	44,556
Moses Gnanam baram Eye Hospital Coimbatore and Podanur	A	100	-	1848	3842	27,105
PUNJAB						
Kisanlal Jalan Free Eye Hospital Bhiwani	A	200 *500	-	200 2765	14368	38,830
Eye Hospital Jullunder City.	A	12				
RAJASTHAN						
A. R. J. Eye Hospital Nawalgarh	A	110 *180		1572	2483,	43, 803
Shree Ratangarh Eye Hospital, Ratangarh	A	50			1562	10, 665

Province Name & Place	Managed by	No. of Eye beds	Total No. of beds	Major Eye Operations	Total Eye Operations	Annual Total Out-door
U. P.						
Shree Madan Mohan Gorg Eye Hospital Hing-ki - mandi Agra	A	6		23	112	25,683
Gandhi Eye Hospital Aligarh	D	300		1,442	3962	23.630
M. D. Eye Hospital Allahabad	C	24 *100		2346	3810	24907
Netra Mandir Azamgarh	A	25		316	456	21,061
Sitapore Eye Hospital Branch Ballia (U. P)	D	20 50		1500	1900	12,000
Dr. Rajora Eye Hospital Bulandshahr	A					
Eye Hospital Deoria U.P.	B	50		501	1244	24,479
M. M. Eye Hospital Fatehpur	B			342	1120	7,546
Hari Eye Hospital Hathras U. P.	A	86 *240		3855	5405	23,995
Eye Hospital Khairabad (Oudh)	A	100		1357	5015	2,4115
Eye Hospital Pratapgarh	B	23,		134	176	3,265
Jain Charitable Dispensary Saharanpur	D	20	20	643	2235	6,469
Chheda Lal Eye Hospital Shamli U. P.	A	10		17	144	5,135

Province Name & Place	Managed by	No. of Eye beds	Total No. of beds	Major Eye Operations	Total Eye Operations	Annual Total Out-door
Eye Hospital, Sitapur	A	360		4942	17597	70,005
Eye Hospital Sitapur Branch Gonda...	A	25		118	2608	12,252
General Hospitals With Eye Wards						
Andhra Pradesh						
Govt. H. Q. Hospital, Kakinada	C	10	308	292	316	95,442
Govt. Hospital Rajahmandry Amalpuram & Ramchandrapuram	C	4	70 751	96	126	-
Raja Mirasdar H. Q. Hospital Tanjore (S.India)	C	58	636	1891	2459	23 440
BENGAL						
S. Karnani Memorial Hospital, Calcutta 20	C	22		323	469	19,931
Calcutta National Medical College Hospital, Calcutta 9.	D	4	300	70	82	859
Nilratan Sircar Medical College & Hospital, Calcutta 14	C	26	712	474	1431	57,751
BOMBAY						
Hathesing Premabhai Civil Hospital Asarwa-Ahmedabad	C	54	353	671	851	4,238
Irwin Hospital Amaravati	C	10	130	581	651	6307
The Pratap Charitable Hospital Amalner E. K.	A	11	102	278	329	1027

Province Name & Place	Managed by	No. of Eye beds	Total No, of beds	Major Eye Operations	Total Eye Operations	Annual Total Out-door
Civil Hospital Belgaum	C	46	155	48	57	519
Civil Hospital Broach	C	4	40	82	83	726
B. Y. L. Nair Charitable Hospital, Byculla Bom. 8.	B	18	330	303	538	17,652
K.E.M. Hospital, Parel, Bombay 12.	B	32	550	657	1990	50,875
Municipal General Hospital Sion Bombay 22	B	-	2	54	124	8,970
Wanless Hospital Miraj.	A	12	350	241	314	+
Mission Hospital Poona City.	A	+	111	26	58	653
Sassoon Hospital Poona 1	C	20	525	+	206	6,995
Civil Hospital North Satara	C	+	50	25	29	471
Talegaon General Hospital & Convalescent Home Talegaon Dabhade		40	160	899	1042	7,972
Civil Hospital Surat	C	+	64	82	98.	2,467
Delhi						
Safdarjang Hospital New Delhi 3.	C	8	346	115	488	16,714
Himachal Pradesh						
District Hospital Chambla.			110	44	50	1996
Vallabha Chikitsalaya Nahan Dt. Sirmur (H. P.)	C	10	100	28	37	1700
Kerala						
Government H. Q. Hospital Kozhekode	C	32	346	887	2265	1,13,247 13,343

Province Name & Place	Managed by	No of Eye beds	Total No of beds	Major Eye Operations	Total Eye Operations	Annual Total Out-door
Madras						
The Kotagiri Medical Fellowship Kotagiri Nilgiris.	A	15	35	656	943	22,47
Swedesh Mission Hospital Tiruppattur. B. Dn. S. India. Madras	A	20	120	333	668	6,545
Christukula Ashram Tirupattur N. A.	A	25	75	420	820	7,600
Madhya Pradesh						
Victoria Hospital Jabalpur	C	39	250	507	857	12,030
Distt. Hospital Sidhi M. P.			52	36	156	1,630
Gandhi Memorial Hospital Rewa M. P.	C	48	400	334	564	
Rajendra Hospital Tikamgarh	C	4	50	10	24	1673
Civil Hospital Ujjain	C	5	172	36	303	6563
Orissa						
Head-quarter Hospital Balangir	C	+	100	26	102	15,560
Punjab						
Lady Hailey Women's Hospital Bhiwani	C	+	52	+	+	272
Civil Hospital Bhawani	C	+	65	+	30	460
Civil Hospital Fatehabad						
Civil Hospital Gurdaspur	C	8	55	102	204	3,765
Civil Hospital Hissar	B	+	36	+	6	1,379
General Hospital Jullandar Punjab	B	100	150	900	1507	8,909

Province Name & Place	Managed by	No. of Eye beds	Total No. of beds.	Major Ey e Operations	Total Eye Operations	Annual Totai Out'door
Central Khalsa Hospital Tarn Taran	A	32	32	265	490	6896
U. P.						
Sarojini Naidu Hospital Agra UP.	C	60		4	955	21.829
District Hospital Almora	C	6	32	11	30	20.006
District Hospital Bijnor	C	12	52	18	81	9332
District Hospital Budaun U. P.	C	10	84	35	76	3.638
P. W. Hospotal Bulandshahr U. P.	C	10	103	6	61	3.153
District Hospital Etawah U. P.	C	8	55	103	298	4.634
Civil Hospital Jaunpur	C	+	123	12	103	7.263
L. Lajpat Rai Hospital Kanpur U. P.	C		38	32	755	7.773
Gandhi Memorial & Associated Hospitals, Lucknow	C	79 *109	750	1221	2381	16.294
Balrampur Hospital Golaganj, Lucknow	C	32	240	495	1333	12.255
P. L. Sharma Hospital Meerut		16	100	401	575	7.770
Crosthwaite Hospital Nainital	C	+	+	15	32	4,667
District Hospital Rae Bareli	C	+	+	*539	645	38,303
District Hospital Rampur	C		8	77	1036	9.625
District Hospital Panri Garhwal	C	+	20	5	11	1,795
District Hospital, Unnao	C	4	34	79	99	s2,825

Eye Relief Work in U. P.

The Scheme for eye relief work for the rural population in U.P. was started in 1939-40 with an initial Government grant of Rs. 13,500/-. With the increase in activities in this direction the grant for the purpose in subsequent years till 1952-53 was gradually increased to Rs. 50,000/-.

In August 1952 a new orientation was given to this work by the Ophthalmic Conference held under the Presidentship of the Hon'ble Sri C. B. Gupta, Minister for Health. Ways and means for the eradiction of eye quackery and blindness in the State were discussed at the Conference and recommendations made by a Sub-Committee comprising Dr. H. N. Bhatt, Principal, Medical College, Agra as its convenor and five other Ophthalmologists and one M. L. A. as its members. This body was constituted to advise Government on various ophthalmic problems. The important recommendations of the Conference which Government approved for implementation in stages were the following :—

1. Formation of the Ophthalmic Advisory Council in the State.
2. Establishment of an eye clinic in every district.
3. Ophthalmic work to continue on Zonal basis.
4. Allotment of a sum of Rs. 1,00,000 for eye relief work.

In 1953 the U.P. Ophthalmic Advisory Council was constituted by Government, consisting of expert Ophthalmologists of the State and representatives of people with Director of Medical and Health Services as its President. The Council holds its metings once or twice in a year. It advises Government on variou Ophthalmic problems and its recommendations are implementeds as funds permit.

The Eye relief work is being done on Zonal basis. The State has been divided into six zones with their bases at Aligarh, Sitapur, Lucknow, Agra, Varanasi and Kanpur. The districts catered by them are noted against each :

Base Hospital	Districts attached.
(1) Eye Hospital Sitapur.	Sitapur, Garhwal, Nainital, Almora, Bareilly, Pilibhit, Bahraich, Shahjahnpur, Hardoi, Kheri, Gonda, Faizabad, Allahabad, Pratapgarh, Jaunpur, Deoria, Gorakhpur, Azamgarh, Basti, Farrukhabad and Ballia.
(2) Gandhi Eye Hospital. Aligarh.	Aligarh, Dehradum. Saharanpur, Meerut, Muzaffarnagar, Bijnor, Bulandshahr, Moradabad, Rampur, Etah, Badaun, Tehri Garhwal, Jhansi, Jalaun, Hamirpur, Mathura, Fatehpur and Banda.
(3) Eye Department of Medical College, Lucknow. Sultanpur.	Lucknow, Barabanki. Rae Bareli,
(4) Eye Department of Medical College, Agra.	Agra, Etawah and Mainpuri.
(5) King Edward VII Hospital. Varanasi.	Varanasi, Mirzapur and Ghazipur.
(6) Lala Lajpat Rai Hospital Kanpur.	Kanpur and Unnao.

The allotment for eye relief work at the disposal of the Director of Medical and Health Services, U.P. for giving grants-in-aid to the Zonal workers and District Eye Relief Societies etc. was raised by Government from Rs. 50,000/- to Rs. 75,000/- from the financial year 1953-54. The District Eye Relief Societies also raise subscriptions and donations locally and finance the local agencies for eye relietf work.

Eye Hospital Sitapur.

It has 360 beds and received a recurring grant-in-aid of Rs. 55,000 till 1955-56. The grant has been raised to Rs. 1,26,000 from the current financial year. In addition a non-recurring grant of Rs. 1,33,400 for wiping off its past deficits is being given. The

Hospital also runs 17 branch eye Hospitals—in the eastern part of the State for which a recurring grant of Rs. 50,000 has been sanctioned with effect from the current year.

Gandhi Eye Hospital, Aligarh.

Besides doing eye relief work through mobile units in 18 districts, it maintains an eye bank and a 300 bedded eye hospital at Aligarh which is one of the most uptodate eye hospitals in the country, having facilities for the treatment of eye diseases. The grant of this institution has also been raised from Rs. 56,100 to Rs. 125,700 per annum from the current financial year. A non-recurring grant of Rs. 1,33,400 has been also given to this institution during the current financial year to eliminate its past deficits. The institution is starting a contact Lens Centre at Aligarh for which Government have sanctioned a non-recurring grant of Rs. 15,000/- during the current financial year.

No. of Ophthalmic beds.

The total number of ophthalmic beds in Eye and other institutions of the State is 1.994 (166 in State institutions and 1828 in private institutions).

Camps.

The number of eye relief camps held under the Zonal Scheme in the State during the year 1955-56 was 173 against 117 during the year 1954-55.

Operations.

The following eye operations were performed in the hospitals during the past three years :—

	1953	1954	1955
Trachoma	3,20,790	3,24,121	3,36,107
Glaucoma	20,474	21,902	32,668
Cataract	50,644	65,259	70,859
Total	3,91,908	4,11,282	4,39,634

Eye Relief in II Five Year Plan.

The following two items of eye relief are included in the IInd Five Year Plan;

Item	Provision for the 1st year (1956-57) Rs.	Total provision in II Five Year Plan. Rs.
(1) Creation of a section of ophthalmology at 10 selected divisional headquarters and other hospitals, in the state.	0.62 lacs	Rs 6.66 lacs.
(2) Establishment of at least one eye camp at each teshil headquarters once a year.	0.40 lacs	7.15 lacs

Under the item (1) two Opthalmic sections were sanctioned at Varanasi and Meerut during the year and under item (ii) eye relief camps were established at 9 places at teshil headquarters viz.— (1) Lohaghat, district Almora (2) Lansdowne, district Garhwal, (3) Gangani, district Tehri-Garhwal, (4) Mohanlalganj,district Lucknow, (5) Tilhar, district Shahjahanpur. (6) Deoband, district Saharanpur, (7) Shikohabad, district Mainpuri, (8) Akbarpur, district Kanpur and (9) Chakia, district Varanasi.

In these camps the patients suffering from various eye diseases are treated and operated upon free of charge.

A total provision of Rs. 4,36,000 is made every year for non-government eye institutions including Eye Hospitals at Aligarh and Sitapur.

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EYE SPECIALISTS IN INDIA

Addendum to 1955 List.

(a) Birth place and age. (b) Qualifications. (c) Appointments.
(d) Hospital beds. (e) Recent papers published.
(f) Other information.

Dr. M. S. Agarwal,
Dr. Agarwal's Eye institute,
15, Daryaganj, Delhi.
(a) Bulandshahar. Age—30. (b) M.D. 1948. (c) Private Hospital.

Capt. Dr. B. Bagchee,
Hospital Road, Laheriasarai,
Bihar.
(a) Bihar. Age 40. (b) M.D. (Hon.) 1954, M.H.A., U.S.A. (c) Washington University Medical Center—Resident. (d) 40. (e) Cortisone in acute Herpes Zoster Ophthalmicus—St. Louis University Hospital Bull. Jan. 1951.

Dr. Baldev Singh,
7B, Astley Hall, Dehradun.
(a) Samana. Age 40. (b) B.Sc. 1940, L.M.S. 1945, D.O.M.S. 1952. (Punjab). (c) Hon. Oph. Surgeon Civil Hospital, Dehradun. (d) 20.

Dr. Girjapathy Beeraka,
Beeraka Brothers Hospital,
Chirala, Guntur Dt. (S.Ry.)
(a) Jandrapet. Age 41. (b) M.B.B.S. 1941. (d) about 25.

Dr. B. N. Bhaduri,
44, Chittaranjan Avenue,
Calcutta 12.
(a) Calcutta. Age 67. (b) M.B. (Cal.) 1918. (c) 1. Emeritus Professor of Ophthalmology. R. G. Kar Medical College. 2. Visiting Surgeon Dr. M. N. Chatterjee Memorial Eye Hospital. (d) Scleral Gumma B.J.O. Aug. 1956. Sub-conjunctival rupture of the sclera and dislocation of lens April 1955. J.A.I.O.S. (f) Past Hon. Secretary, All India Ophth. Society from 1933-48. Past Hon. Secretary Bengal Ophth. Society from 1937-44. Past President, All India Ophth. Society 1952.

Dr. Govindlal R. Bodiwalla,
121, Sarangpur, Ahmedabad.
(a) Ahmedabad. Age 46. (b) L.C.P.S. 1938, D.O.M.S. 1940. (c) Swastic Rugnalaya Parvatibai Eye Hospital. (d) 6.

Dr. O. P. Chhabra,
I/C. Blind Relief Mission,
Dhantoli, Nagpur.
(a) D. I. Khan. Age 33. (b) L.M.F. 1950, L.O. 1952. (c) Blind Relief Mission, Nagpur. Sant Paramanand Blind Relief Mission, Delhi. (d) 40.

Dr. Vasant Keshav Chitnis,
Kirshna Niwas Opposite Charni
Road Garden, Queen's Road,
Bombay 4.
(a) Shrivardhan (Dist. Kolaba). Age 59. (b) M.B.B.S. 1923, D.O. (Bom.) 1928, F.C.P.S. 1933, D.O. (Oxon.) 1934. (c) Hon. Specialist in Ophthalmo-

logy. Sir C. J. Ophthalmic Hospital. Hony. Ophthalmic Surgeon, Bombay Hospital. (d) "Corneal Grafts & Eye Bank", June '55. J.I.M.A.

Dr. Veerdeosinh S. Chudasama,
Eye Hospital Ranjit Road,
Jamnagar, (Saurashtra).
(a) Cher. Age 34. (b) L.M.P. 1948, M.B.B.S. 1951, D.O.M.S. 1954. (d) 8.

Dr. Jitendranath De,
38/C, Cornwallis Street,
Calcutta 6.
(a) Calcutta. Age 54. (b) M.B. (Cal.) 1928, D.P.H. (Cal.) 1932, D.T.M. & H. (Lond.) 1937, D.O.M.S. (Cal.) 1954.

Dr. Dhanda R. P.
M. G. M. Medical College,
Indore.
(a) Manakpore. Age 42. (b) L.C.P. & S. 1939, L.O. 1942, M.B.B.S. 1949, D.O. London 1950, M.S. 1955. (c) Lecturer in Ophthalmology. Officer Incharge Electroretinography unit of I.C.M.R. (e) (1) Electroretinography in Night Blindness and other Vit. A deficiencies. Arch. Opth. Vol. 54 No. 6. (2) ACTH in optic neuritis J.I.M.A. Vol. 28 No. 10.

Dr. B. K. Dhir,
Medical College, Indore.
(a) Kapurthala. Age 48. (b) M.B.B.S. 1934, M.S. 1941, D.O. M.S. (London) 1949. (c) Eye Surgeon Medical College Hospital, Indore. (e) (i) Surgical treatment of Ptosis by fascialata strips. I.J.M.S. Vol. II No. 2. Feb. 1957. (ii) Investigation and treatment of Heterophoria Antiseptic. Vol. 53, No. 12, Dec. 1956.

Major M. M. A. Dubash,
Eye Hospital, 39 Garden Road,
Bombay 1.
(a) Bombay. Age 55. (b) M.B. B.S. 1927, M.C.P.S. 1929, D.O. (Bom.) 1929. D.O. (Oxon.) D.O.M.S. (Eng.) 1937. (c) Hon. Ophthalmic Surgeon, St. George's Hospital, Hon. Ophthalmic Surgeon Jain Clinic & Eye Hospital. (e) Corneal grafting and Eye Bank for Sight Restoration. (ii) Micro Lens—modern trends in contact lens therapy.

Dr. M. B. Dwivedi,
Delhigate, Ahmedabad.
(a) Age 62. (b) M.B.B.S. 1924, D.O. 1930. (e) F.B. Non-magnetisable deeply embedded in cornea. Read at 2nd Bombay State Opth. Conference. 1956.

Dr. A. H. Gandhi,
M.O. Govt. Dispensary,
Pandharpur.
(a) Amreli. Age 38. (b) L.M.P. (C.P.) 1948, D.O. (Vienna) 1954. (c) American Mission Hospital, Miraj. (d) 25. (e) (i) Xerosis in children, (ii) Importance of Occular findings in general medicine. (f) Member Rotary Club, (2) Patron: St. John Ambulance Association of India.

Dr. A. M. Gokhale,
Ramkrishna Nivas, 380 N. C. Kelkar Road, Bombay 28.
(a) Ratnagiri. Age 45. (b) L.C.P.S. 1935, D.O.M.S. 1938, M.B.B.S. 1947, D.O. (Bom.) 1949, D.O. (Lon.) 1950. (c) Yemunabai Nair Hospital, K.B. H.B. Ophthalmic Hospital Bombay. (d) 5.

Dr. P. Gopal Ratnam,
Eye Specialist, G. M. Hospital,
Rewa (M.P.).
(a) Madras. Age 48. (b) M.B. B.S (Mad.) 1936, L.O. (Mad.) 1948, D.O. (Mad.) 1949 April. (c) Hony. A.M.O., Govt. Oph. Hospital Madras 1948 to 1953. Eye Specialist and consultant G. M. Hospital, Rewa (M.P.).

Dr. D. P. Gorde, F.C.P.S.,
Eye, Ear Nose & Throat Specialist, Miraj.

Dr. P. K. Guha,
63, Dharamtala Street,
Calcutta 13.
(a) Age 50. (b) M.B. (Cal.) 1931, M.R.C.S. (Eng.) 1934, D.O.M.S. (Lond.) 1935. (c) Hony. Senior visiting Surgeon, Calcutta Medical College, and Hony. Editor, Journal of the Indian Medical Association and "Your Health".

Dr. Prem Nath Gupta,
Prem Eye Hospital,
Jullundar City.
(a) Mehraj. Age 64. (b) M.P.H. 1918, M.S.M.F. 1927. (c) Ex. In-charge Eye Hospital, Moga. (d) 100.

Dr. S. P. Gupta, F.R.C.S., D.O.M.S. Professor of Ophthalmology, Medical College,
Lucknow.

(a) Age 48. (b) M.B.B.S. (Lucknow) 1935, F.R.C.S. (Ed.) 1940, D.O.M.S. (Lond.) 1938. (c) Professor and Head of the Department of Ophthalmology, Medical College, Lucknow. (d) 1. Eale's Disease, its Etiology and treatment. 2. Trachoma; early Diagnosis and treatment.

Dr. Shantiswarup Gupta,
Mahatma Gandhi Eye Hospital,
Raigarh, (M.P.).
(a) Phagwara. (b) L.S.M.F. (Pb.) 1936. (c) Ex. Chief Medical Officer, Blind Relief Mission, Nagpur. (d) 100.

Dr. Tej Bahadur Gupta,
Darbhanga Medical College,
P.O. Laheria Sarai (Bihar).
(a) Khagaria. Age 44. (b) M.B.B.S. 1937, D.O.M.S. (Lon.) 1948, D.L.O. (Lond.) 1949. (c) Professor of Ophthalmology Darbhanga Medical College.

Dr. T. N. Gupta,
Dr. Shroff's Charity Eye Hospital, Delhi.
(a) Sirsa (Pb.). Age 32. (b) M.B.B.S. (Madras) 1948, M.S. (Ophth.) (Lucknow) 1952. (c) Senior Resident, Dr. Shroff's Eye Hospital Delhi. Resident cum Refractionist Dayanand Hospital Ludhiana. (d) 170.

Dr. Vishnu Prakash Gupta,
Prakash Eye Hospital,
Saharanpur, (U.P.).
(a) Deoband. Age 44. (b) L.S. M.F. (U.P.) 1938, D.O.M.S. (Bom.) 1940. (c) Hon. Ophthalmic Surgeon Government School Dispensary, Saharanpur. (d) 23.

Dr. K. G. Gurubatham,
Salem 5.
(a) Tirupathur. Age 32. (b) M.B.B.S. 1951, D.O. (Madras) 1957. (c) Moses Gnanambaram Eye Hospital Coimbatore (d) 20.

Dr. M. V. Hanumantharao,
Lakshmivarappet, Rajahmundry, Andhra.
(a) Visakhapatnam. Age 59. (b) L.M.P. 1921, L.O. 1937. (c)

Retired Civil Asstt. Surgeon. (d) 6.

R.B. Dr. Hari Dass,
13, Civil Lines, Ambala City.
(a) Lahore. Age 63. (b) M.B. B.S. 1918, D.T.M. 1923, F.R.-C.S. 1927, (c) (i) Rajendra Hospital Patiala. (ii) Eye Hospital Sitapur.

Dr. M. T. Joshi,
M.O. I/C. Free Eye Hospital,
Bharapur, (Kutch).
(a) Nasik City. Age 32. (b) L.M.P. (Bom.) 1949. (d) 1.

Dr. R. M. Kotasthane,
C. R. Wadia Dispensary,
Jambli Naka, Thana.
(a) Natepute, Age 48. (b) M.B.B.S. (Bom.) 1939. (c) C. R. Wadia Ophthalmic Unit. (d) 4.

Lt. Col. C. S. Krishna Murthi,
Military Hospital,
Delhi Cantt.
(a) Bangalore. Age 45. (b) M.B.B.S. (Bom.) 1937, D.O.-M.S. (Lond.) 1940. (c) Military Hospitals, India.

Dr. K. Krishnamurty,
L. N. Hospital,
Chodavaram, (Dt. Visakha).
(a) Chodavaram. Age 49. (b) L.M.P. (Mad.). (d) 20.

Dr. Harsha Gopal Kundu,
Bankura, (West Bengal).
(a) Chaibasa Dt. Singbhum. Age 56. (b) M.B.B.S. (Patna) 1928. (c) Eye Surgeon Medical School Hospital, Bankura. (d) 14.

Dr. Madan Mohan,
10 Convent Road, Dehradun.
(a) Roorkee. Age 41. (b) M.B. B.S. (Lck.) 1940, L.O. (Mad.) 1941, (c) House Surgeon in Ophthalmology, K. G. Medical College, Lucknow 1940-41. (d) 15. (f) Holds about 4 free Eye camps every year.

Dr. J. M. Makheja,
M.O. I/C. General Hospital,
Partabgarh-Raj.
(a) Dandi, (Bahawalpur). Age 38. (b) L.C.P.S. 1943, M.B.B.S. 1955, D.O.M.S. 1945. (c) Ex. M.O. Sant Parmanand Blind Relief Mission, Delhi 1945-46. (2) M.O. I/C. Henderson Blind Relief Association Sindh, 1946-48.

Dr. S. H. Marathay,
Optiplast Corporation,
183, Girgaum Road, Bombay 4.
(a) Alibag. Age 53. (b) M.B. B.S. 1933. (e) Contact Lens fitting. Corneal (Micro) Lenses.

Dr. M. P. Mehrey,
Eye Hospital, Sitapur.
(a) Allahabad. Age 58. (b) M.B.B.S. (e) Chief Surgeon Eye Hospital, Sitapur. (d) 410. (e) (i) Blindness in India. (ii) Radiology in Ophthalmology.

Dr. C. L. Mehta,
Box 365, Moshi T.T.
B.E. Africa.
(a) Junagadh (India). Age 32. (b) M.B.B.S. 1951, D.O.M.S. 1953. (d) 7.

Dr. K. C. Shankara Menon,
Civil Surgeon Retd. Shornur Road, Trichur, Kerala State.
(a) Cranganore. Age 68. (b) L.M.S. (Mad.) L.R.C.P. (Edin). L.R.F.P.S. (Edin) 1930, D.O.-M.S. (Lon.) 1931. (c) Hon. Consultant to Govt. Ophthalmic Hospital, Madras. Professor of Ophthalmology Madras Medical College, Madras.

Dr. Mohanlal,
Gandhi Eye Hospital, Aligarh.
(c) Chief Medical Officer, Gandhi Eye Hospital, Aligarh.

Dr. Haraprasad Mukherji,
Vill. Barasat Dist. Hoogly.
P.O. Chandernagore, (W.B.).
(a) Chandernagore, (W.B.) Age 30. (b) M.B.B.S. (Cal.) 1952. (c) Senior House Surgeon, Dr. M. M. Chatterji Memorial Eye Hospital, Calcutta. (d) 26.

Dr. J. A. Muthiah,
K. M. Hall, Tanjore.
(a) Tanjore. Age 41. (b) M.B. B.S., L.O. (c) Hon. Ophthalmic Surgeon H. Q. Hospital. (d) 4.

Dr. V. D. Nimkar,
Manohar Nagar Colony,
Lucknow.
(a) Age 64. (b) F.R.C.S. (Edin) 1918. (c) Hon. Surgeon, Govt. Ophthalmic Hospital, Madras. (ii) Eye specialist I.M.S. Retired.

Dr. Om Prakash,
18, Kotla Road, New Delhi.
(a) Punjab. Age 31. (b) M.B. B.S. 1950, M.S. 1957, D.O.M.S. 1952. (d) 1. (e) Dacryocysto-Rhinostomy a simplified technique-analysis of results, J.A.I. O.S. 1955, (2) Paradoxical lid Reteraction B.J.O. 1956.

Dr. Bhaskar Yashwant
Paranjape,
24, New Queens Road,
Bombay 4.
(a) Terdal. Age 55. (b) L.C. P.S. 1927 Dec. Dipl. Ophth. (Vienna), Dec. 1931. (d) 4.

Dr. Bhikhubhai Somabhai
Patel,
Shiv Sadan 2, Bharti Society,
Ellis Bridge, Ahmedabad.
(a) Nadiad. Age 36. (b) M.B. B.S. (Bom.) 1949, D.O. (Bom.) 1953, D.O.M.S. (Bom.) 1952. (c) B. J. Medical College, and Civil Hospital, Ahmedabad. (d) 12. (e) Practice of Ophthalmology in India. Bulletin of Medicine Toronto University, Sept. 1954. Toronto, Canada. (f) Worked as Colombo Plan Scholar at teaching hospital & Banting & Best Institute Toronto University, Toronto, Canada.

Dr. Hirabhai Dharmdas Patel,
Anand Nivas, 4th floor Opp. Krishna Cinema, Ahmedabad.
(a) Davol. Age 43. (b) L.C.P.S. 1938, D.O.M.S. 1942. (d) 32.

Dr. Naranlal Manganlal Patel,
Moti Rangila Pole,
Shahpur, Ahmedabad.
(a) Ahmedabad. Age 35. (b) M.B.B.S. (Guj.) 1951, D.O.M.S. (Bom.) 1954, D.O. (Vienna) 1955. (c) Dr. G. G. Patel's Hospital, Ahmedabad.

Dr. A. Rahman,
Dr. Rahman's Eye & ENT Hospital, Karaikudi, (South India).
(a) Trichinapoly. Age 34. (b) M.B.B.S. 1951, D.L.O. 1954. (c) Owning own hospital, which was originated by father-in-law (Dr. Jabbar). (d) 17.

Dr. Kamalakar Gopal
Ratnaparkhi,
5th Lane Dhulia, W Khandesh
(a) Ahmednagar. Age 40. (b) L.C.P.S. 1940, D.O.M.S. 1943. (c) Hon. Ophthalmic Surgeon Civil Hospital, Dhulia, (d) 6.

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